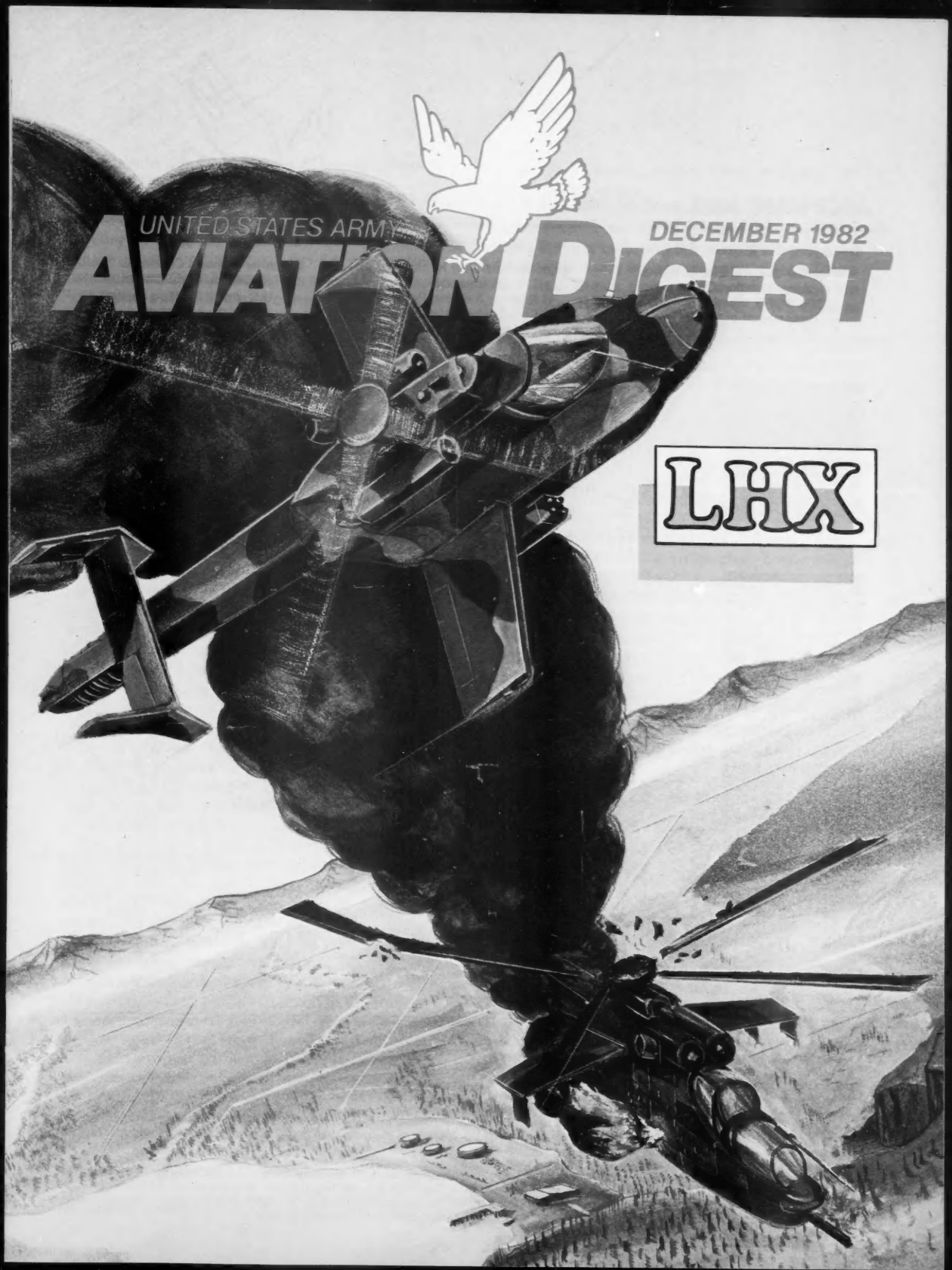
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DECEMBER 1982
LHX

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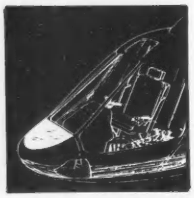

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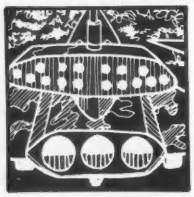

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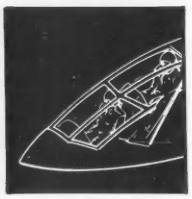

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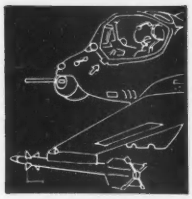
Cover: **As the Soviets proliferate the battlefield with more and more helicopters, the chances of encountering our helicopters becomes stronger and stronger—and the result will be air-to-air combat. On the cover an LHX destroys a Hind. Illustration by S. Beland**



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Honorable John O. Marsh Jr.
Secretary of the Army

Richard K. Tierney
Editor

The mission of the *U.S. Army Aviation Digest (USPS 415-350)* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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Articles, photos, and items of interest on Army Aviation are invited. Direct communication is authorized to Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Fort Rucker, AL 36362. Manuscripts returned upon request.

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This issue rings out the old year and brings in the new—and a good year it has been for Army Aviation. Our 40th Birthday, delivery of Black Hawks and fully modernized Cobras to Europe, delivery of the first production CH-47D to the training base, initiation of AH-64 production, installation of CH-47 simulators at Fort Campbell, Fort Hood and in Europe, completion of a most comprehensive Mission Area Analysis, the quadrennial Army Aviation Systems Program Review, test of the first Cavalry Brigade (Air Attack) and many other significant milestones came our way.

But, on the horizon for 1983 are many more equally challenging and rewarding events for Army Aviation. In the concepts and hardware areas, the Light Helicopter Family (LHX) promises to be one of the biggest and this issue focuses on that new generation of Army Aviation systems for the 1990s.

It is my privilege to introduce the subject and describe the LHX conceptual formulation. In turn, Captain (P) Fred Brown discusses the support the LHX provides in the eight functional areas of the AirLand Battle 2000 concept. Mr. Donald R. Artis Jr., of AVRADCOM relates some of the technologies being considered to make the LHX an "affordable, effective weapon system...."—Then Major Michael L. Brittingham takes an imaginative look at the success of the LHX in a battle somewhere "east of Dresden." First, however, he makes a strong case for the necessity of the proposed family of light, versatile helicopters by telling the story of a battle where our present generation of helicopters, without improvements, might not fare so well against superior enemy aircraft.

But even with LHX in the offing, we must continue to do better with what we have and improve thereon. And constant improvements are a part of that effort. One of those is reported on by Lieutenant Colonel Donald E. S. Merritt and Charles C. Cioffi in "OH-58 Power Droop." They list an investigative panel's findings and recommendations of ways to eliminate the phenomenon "which manifests itself in the form of a power turbine droop" and is definitely not a desirable condition for our aeroscout aircraft.

A prime contribution to the overall professionalism of our aviation force is made by the DES flight standardization teams' evaluations. A briefback on their work in FY 1982 is contained in the "DES Report to the Field." You should be interested in the summary "health check" of aviation everywhere.

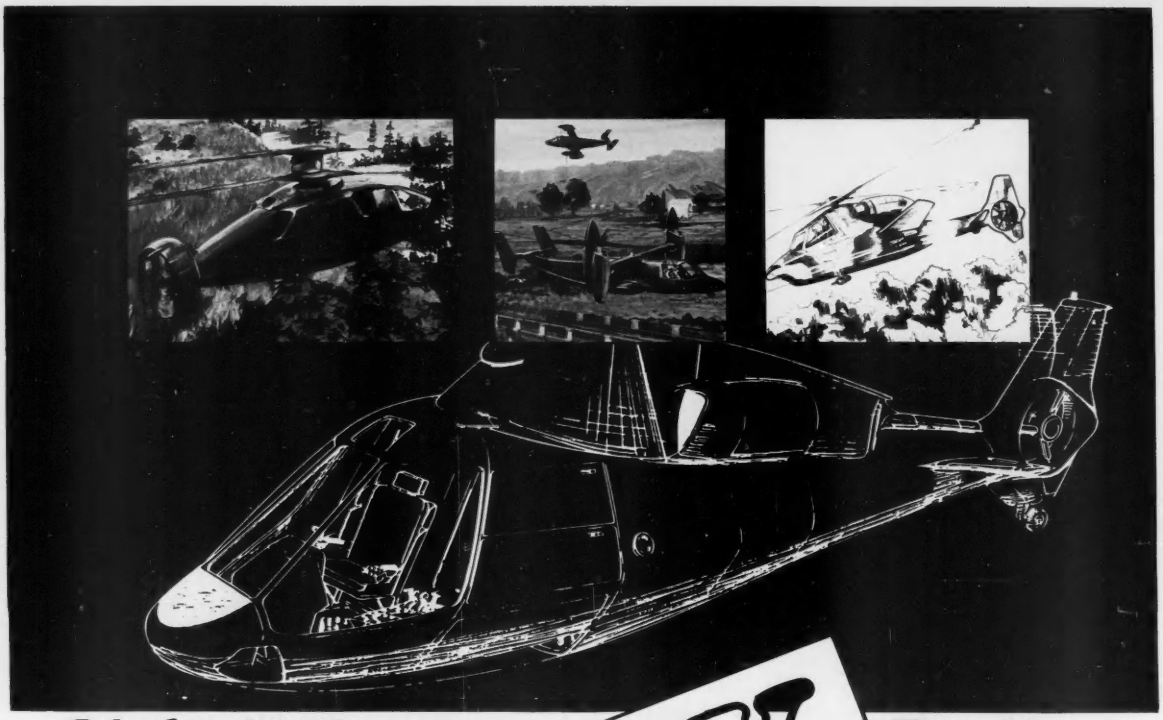
And just as standardization is vital to Army Aviation, so is safety—and survival. We must ensure that our units and our people are prepared with the necessary emergency equipment. Three pilots had theirs and they lived through an accident, as Chief Warrant Officer, CW3 William W. Shawn relates in "Who Needs It Anyway?"

While survival equipment must be available, proper care and caution on the part of each Army Aviation team member may alleviate the need for it. Colonel Joseph R. Koehler, U. S. Army Safety Center commander, makes some apt and timely safety observations in "The Harsh Lessons of FY 82." He writes, in part, about actions commanders can take to encourage—and enforce—the level of self-discipline we all must practice to be ACCIDENT FREE IN '83. During this, the final quarter of 1982, it has become readily apparent that the entire chain of command has turned to and applied the safe flying practices for which Army Aviation has long been recognized. Keep up the visibility and restore the credibility to our splendid aviation safety initiatives.

So, to each and all, a hearty well-done for 1982 and a challenge to do even better in 1983 on all fronts—personnel, operations, maintenance, training, safety and readiness. We owe it to our Army and our profession.

Merry Christmas to all and to all a good flight!!

Major General Carl H. McNair Jr.
Commander, U.S. Army Aviation Center
Fort Rucker, AL



Light Helicopter LHX Family

the Conceptual Formulation of Why, What and When

Major General Carl H. McNair Jr.
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DURING THE WAR Between the States, that famous cavalryman Lieutenant General Nathan Bedford Forest, the Grey Ghost, was asked how to win a battle. His answer: "Git thar fustest with the mostest." In other words, mobility.

History is replete with examples of military victories where getting there first with the most was the key to victory. Mobility always has been, is now and will continue to be for the foreseeable future the key to victory, especially when a force is fighting outnumbered or over hostile terrain, such as occurred in Vietnam. Aviation has been the Army's leader in mobility throughout the past two decades. The UH-1 Huey, the AH-1 Cobra and the OH-58 Kiowa provide the greatest mobility and are the backbone of Army Aviation. These aircraft, representing 1950s' technology, will continue to be the fleet workhorses for some time to come; however, they are rapidly becoming obsolete and will soon require replacement. Some are being phased out now with the UH-60 Black Hawk, AH-64 Apache and AHIP, which is an improved OH-58 that can fill the immediate scout role. But these replacement aircraft will not be procured in sufficient numbers, and we will continue to fall short of meeting force structure requirements. How, and with what, do we replace these aging birds? A possible answer is the Light Helicopter Family, referred to as the LHX. The U. S. Army Aviation Center, along with our mission proponents, is involved in the conceptual formulation stage of development for the LHX.

Why LHX?

The first and foremost reason for an LHX is a necessary response to the threat. The threat is real. In addition to superior numbers in every category of equipment, the Soviets have made significant increases in the quality of their equipment. Of particular concern are recent indications by intelligence sources of a growing fleet of Mi-24 Hind attack helicopters. This increase is seen by many as a move to counter the effectiveness of U.S. antitank helicopters, as well as to attack our armored forces. With the proliferation of Soviet helicopters on the battlefield, it is certain that helicopter air-to-air combat will occur. Just as we use the attack helicopter to counter the Soviets' tank advantage, the Soviets may be trying to checkmate our attack helicopters with their attack helicopters. Equally critical are projections on fielding of threat directed-energy weapons such as lasers, electromagnetic pulse (EMP), microwave and particle beam weapons.

The second reason for the LHX surfaced during our recently completed Army Aviation Mission Area Analysis (AAMAA), which analyzed aviation's ability to perform its mission against an advanced threat force. In accomplishing the analysis, the AAMAA identified 77 deficiencies in Army Aviation. One is the problem of an aging aircraft fleet. During the Army Aviation Systems Program Review last March, this deficiency was redefined as fleet obsolescence, which more accurately describes the problem. After all, age in and of itself is not sufficient reason to replace a fleet. The fact is we do not have a historical base from which to measure how long, in terms of age, the current fleet will last. Figure 1 portrays the magnitude of the problem we face. Do not be misled by the term "average age." Today we are flying UH-1s that are more than 20 years old. The problem is much more than it appears. We are faced with replacing these aircraft over a protracted period of time. Theoretically, if we start to develop replacements this year, it will be the mid-1990s before we actually begin to field aircraft. Based on a theoretical production rate of 120 aircraft per year starting in 1995, it will take about 50 years to replace the fleet. At that rate, we may find ourselves flying Hueys and Cobras that are 40 to 50 years old.

The deficiency, fleet obsolescnce, is much more than just a question of age. These are 1950s' technology aircraft which were, for the most part, procured in the 1960s and early 1970s. The issue is operational and tactical obsolescence, combat effectiveness, survivability and, finally, future economic and logistic supportability costs.

Avionics in the current fleet provides an example of problems encountered in capability, survivability and supportability. Today's radios are products of late 1960s' technology which has been overtaken by miniaturization of electronics. Spare parts are either cost prohibitive or no longer available. Supportability analyses indicate that our current generation of radios will be economically unsupportable by the late 1980s or 1990s. In the recent past, the electronics industry has made major advances about every 5 years. Given this technological momentum, even a 10-year service life expectation may be optimistic. Additionally, our radios have a mean time between failure of less than 500 hours, and none have electronic counter-countermeasures capability or protection from lasers or EMP.

Avionics is not the only problem area. The current fleet also suffers similar problems in engine, transmission and rotor systems. All piecemeal efforts at product improvement are going to be extremely expensive with marginal improvements in capability, survivability and supportability.

FIGURE 1: Fleet Obsolescence

System	Average Age	
	in 1982	in 2000
UH-1H Iroquois	12	30
AH-1 Cobra	10	28
OH-58 Kiowa	10	28
OH-6 Cayuse	14	32

The third reason for LHX revolves around future missions and how we plan to wage war. The AirLand Battle 2000 concept is our planning tool for the outyears. This tool focuses 20 to 40 years into the future to guide materiel, organizational, doctrinal and training requirements. Figure 2 provides the focus for technology in our future materiel developments and acquisition. The problem of fleet obsolescence is aggravated by the increasing Soviet helicopter threat, coupled with our own evolving missions such as air-to-air combat and across forward line of own troops operations.

What Is LHX?

The LHX is envisioned as a new development aerial platform capable of performing vertical lift missions in the AirLand Battle of 1995 and beyond. LHX will capitalize on the concept of commonality by using engines, rotors, drive trains and other common dynamic components to fill requirements for scout, light attack, light utility and observation aircraft. Although requirements are not yet clearly defined, the LHX is envisioned to be smaller in size than the AH-1 and UH-1, but larger than the OH-58. Mission gross weight is expected to be 6,000 to 8,000 pounds.

The LHX will be simple to operate, yet of necessity it will probably be a technologically complex aerial platform. A primary developmental goal is reduction of pilot workload.

FIGURE 2: Focus for technology in the AirLand Battle 2000 close combat

- **Family of Vehicles Similarly Equipped**
- **EMP/EW Hardened**
- **Lightweight Vehicles, Smaller Crews**
- **24-Hour/All-Weather Operations**
- **Dual/Triple Capable Weapons**

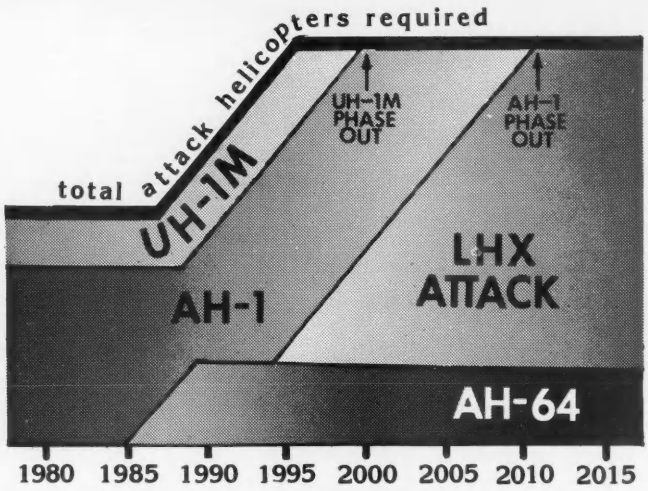

FIGURE 3: Fleet Obsolescence — Attack Helicopters

The LHX may employ a one-pilot cockpit. If so, it will be highly automated, which brings us to an equally important goal of the program. The aircraft *must be* easily maintained and logistically supportable. The concept of a family of aircraft using common dynamics should assist greatly in reaching this goal.

LHX is envisioned as a high performance, high capability system. High performance, however, does not necessarily imply high speed. The jury is still out on the speed issue. We are investigating the value of speed to determine what speed really does for us in terms of productivity and survivability. Survivability must be integrated into our next generation of aircraft, not merely strapped on as is the case of our current aircraft survivability equipment.

With the current interest in self-deployability, we are actively investigating the need for self-deployment in all future systems. Self-deployability is a goal of the LHX program, but not a requirement at this time. The challenge to be overcome is the weight of the aircraft. An aircraft in the 6,000- to 8,000-pound class is somewhat restricted in the amount of fuel it can carry. LHX may have 3.5 hours' fuel in onboard tanks, and it will have new fuel-efficient engines. With the addition of fuel pods on external stores stations, self-deployment becomes a real possibility. Even if self-deployable, LHX must be small enough to be easily transported in aircraft of the C-141 or future cargo-class aircraft.

Two versions of the LHX are envisioned. Remember that the aircraft will have common engines, rotors, drive trains, core avionics and other common subsystems. One version may be the scout/attack, or SCAT. The SCAT will have multimission versatility that will permit it to be tailored rapidly to perform in either the scout or attack role. Having this capability would enable commanders to configure their units as missions dictate and would give them a flexibility they have never known before.

A second version is the LHX-utility and observation variant. This aircraft also would have multimission versatility, and with minimal alter-

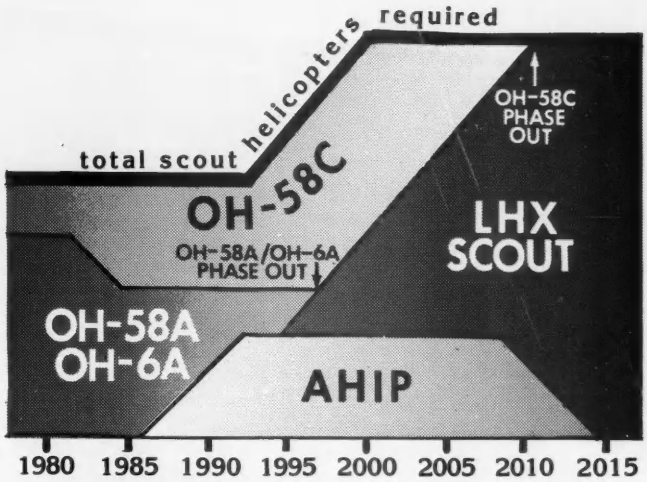

FIGURE 4: Fleet Obsolescence — Scout Helicopters

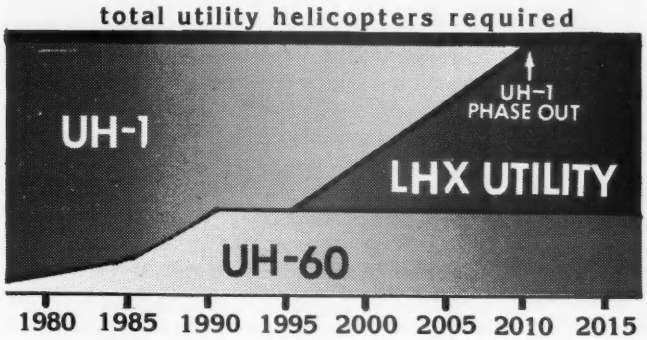

FIGURE 5: Fleet Obsolescence — Utility Helicopters

ations the utility version could be used in the light observation role.

When Do We Need LHX?

To determine *when* we need LHX, we must look at what we currently have in the fleet and what we have planned. The plan for the attack helicopter fleet is shown in figure 3. Currently, the attack helicopter fleet is composed of a mix of AH-1 and UH-1M gunships. We must start thinking now about how we are going to fill the force and replace those older aircraft. Discounting the UH-1M gunships in the National Guard, we are short attack helicopters today. The AH-64 will lessen the severity of this problem but will not solve it. The LHX SCAT will begin replacing the older aircraft in the mid-1990s.

In the scout category (figure 4), we currently meet the authorized acquisition objective (AAO) with a mix of OH-58C, OH-58A and OH-6A Cayuse aircraft; however, the OH-58C is only marginally scout-capable and the OH-58A and OH-6A are unsuitable as scouts. The Army Helicopter Improvement Program (AHIP) aeroscout will improve the situation somewhat; but a constrained budget will not allow significant improvement in the scout picture in the near to midterm.

In the utility category (figure 5), we currently meet the AAO with a mix of UH-1H and UH-60 aircraft. As we field the Black Hawk, we will continue to reduce the UH-1 inventory at a 15-for-23 exchange rate. Even though the UH-1 fleet is rapidly becoming obsolete and unsupportable, we are going to have Hueys around well into the 21st century. Initial operational capability of the LHX will be in the mid-1990s; but at a theoretical production rate of 10 per month (120 per year), we will not wash out the Hueys until about 2015. Some of these aircraft will be approaching 50 years of service about then.

As noted earlier, we are in the concept formulation stage of development in this program. Over the next few months we will publish a series of articles, all of a conceptual nature. Your response to these articles and input to this vital step in the developmental process is encouraged. We feel that the far-term solution to the threat, obsolescence and evolving mission requirements is development of the LHX. This single solution will, in itself, eliminate most of the materiel deficiencies identified in the AAMAA.

LHX presents us with an opportunity to develop a system using the total systems approach to development. We can meet the threat challenge, solve the fleet obsolescence problem and win the AirLand Battle of the future. To be successful, the LHX program must begin now with concept formulation and we must field both versions of the LHX prior to the year 2000.

LHX in the AirLand Battle 2000

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THE AIRLAND BATTLE of the future will require a style of waging war in which agility, deception and maneuver are the keys to success. We must present the enemy with a succession of unexpected tactical situations faster than he can react. This battle, which is extended by tactical necessity far into the enemy's rear areas, requires highly mobile firepower —intensive maneuver forces capable of fighting and surviving in the presence of conventional, nuclear, biological, chemical and tactical electronic devices.

In order to fight this extended battle, we must maneuver our forces rapidly to strike deep into the enemy's rear echelons. Aviation's inherent mobility

and firepower potential provide commanders with a force capable of sustaining the rapid, decisive action demanded. The advanced concepts emerging from the continuing evolution of the AirLand Battle require a parallel evolution of Army Aviation.

Exploiting significant advances in technology will enable Army Aviation to support the AirLand Battle 2000 concepts and will significantly improve capabilities in the performance of the traditional attack and aeroscout missions.

In order for Army Aviation to support more fully the operational concepts of AirLand Battle 2000, a new fleet of light vertical takeoff and landing aircraft is required. The helicopter technology associated with the Light Helicopter Family (LHX) will provide the commander with enhanced aviation capabilities in the following critical areas: greater endurance; increased dash speed; adverse weather, day/night nap-of-the-earth (NOE) capability; electronic counter-countermeasures (ECCM) including electro-optical, radar, acoustical and infrared (IR); electronic countermeasure (ECM) resistant navigation and communications; nuclear, biological and chemical hardening and crew protection; strategic mobility; increased maintainability; advanced target acquisition systems; and enhanced weaponry. The LHX will be able to take advantage of emerging technological gains in aeromechanics, propulsion, structures, aviation electronics, weapons, countermeasures, mission support equipment and systems integration.

In the AirLand Battle 2000 concept, Army Aviation is integral to all forces and battlefield functions. Aviation elements include manned aerial elements and unmanned aerial elements. This article shows how the LHX supports the manned aerial aspects of the AirLand Battle.

The very nature of Army Aviation in the year 2000 allows it to lend support to both levels of war. In support of the strategic level, aviation is able to self-deploy and be rapidly deployed, while possessing the ability to collect intelligence in depth. At the operational level, aviation, as a form of maneuver, provides firepower, mobility, mass action and the capability to operate independently for AirLand Battle force commanders.

The mission of Army Aviation in the year 2000 pervades all mission areas and all battlefield tasks. Army Aviation must rapidly deploy; find, fix and destroy enemy ground and aerial forces using fire and maneuver; conduct reconnaissance operations; conduct airmobile and aerial logistic operations; provide command, control and communications; provide field artillery aerial observer platforms; provide aerial mine dispensing and engineering support; and enhance the intelligence and electronic warfare capability of the AirLand Force (ALF). The LHX, by the nature of its capabilities, supports all of these mission areas.

Aviation equipment for the AirLand Battle of the year 2000 will have a multifuel capability, be simple to operate and maintain, easy to decontaminate, and capitalize on the component replacement theory rather than the fix-it theory. Robotics, automation, miniaturization and microelectronic technologies will enable aerial platforms to accomplish more tasks more efficiently and by refinement of the man-machine interface (one-man cockpit) assure economy of personnel with an increase in capability. The LHX will be designed with all of these requirements in mind.

The AirLand Battle 2000 concept is divided into eight functional areas. Those functional areas are close combat; command and control; fire support; air defense; intelligence and electronic warfare; communications; combat support, engineer and mine warfare; and combat service support. As mentioned, the LHX will support each of these functional areas.

Close Combat is predicated on the maneuver of highly mobile, mission sufficient combat forces. The battlefield is organized in depth, extends full circle and orients on the enemy. Seizing the initiative to conduct offensive action is the key. Army Aviation, a maneuver element, as part of close combat forces, extends the capability of AirLand Battle force commanders in all close combat functions.

The LHX accomplishes this task by enabling commanders to perform the following tasks:

- See deep
- Move fast to strike
- Quickly seize the initiative
- Finish the tactical operation
- Exploit success
- Begin the fight again
- Decentralize execution
- Target critical nodes.

The LHX supports ALF commanders by adding to their **command and control** (C^2) capability. Configured as a special electronics mission platform, the LHX provides commanders with the ability to see deep into the area of interest. When configured with special data distribution devices it could provide a mobile platform to collect and disseminate information on both the enemy and friendly situations.

With this same equipment, it provides a retransmission platform for communication with subordinate elements. As aeroscouts for field artillery aerial observer platforms, the LHX provides an excellent means by which to rapidly and efficiently acquire and engage targets. As a troop carrier it is capable of rapidly repositioning forces on the battlefield.

The ability of Army Aviation to move rapidly about the battlefield unrestricted by terrain provides ALF commanders' **fire support** efforts the flexibility required to attack enemy targets that other weapon platforms cannot detect, engage or respond to in time. This mobility also allows ALF commanders to employ their antiarmor-capable aerial platforms against the enemy's second echelon forces. The LHX in the attack role provides the ALF with weapons systems capable of destroying armored and infantry forces. In the observation role, the LHX provides an excellent platform for the aerial observers to adjust all means of fire support.

Army Aviation significantly enhances the functions of **air defense** on the AirLand Battle 2000 battlefield. Combat configured LHX can engage enemy aircraft with air-to-air weapons. They also can be employed to destroy enemy air defense weapons in a suppression of enemy air defense (SEAD) role. As observation platforms, the LHX, using onboard sensors, can detect and report movement of enemy air elements. As a transport aircraft, the LHX can quickly reposition air defense assets to counter air raids or to fill voids in friendly air defense coverage.

Army Aviation, as an integral part of the **intelligence and electronic warfare (IEW)** effort, provides the aerial platforms and battlefield mobility required to support AirLand Battle force commanders' tactical IEW requirements. This tactical IEW support falls into two general categories:

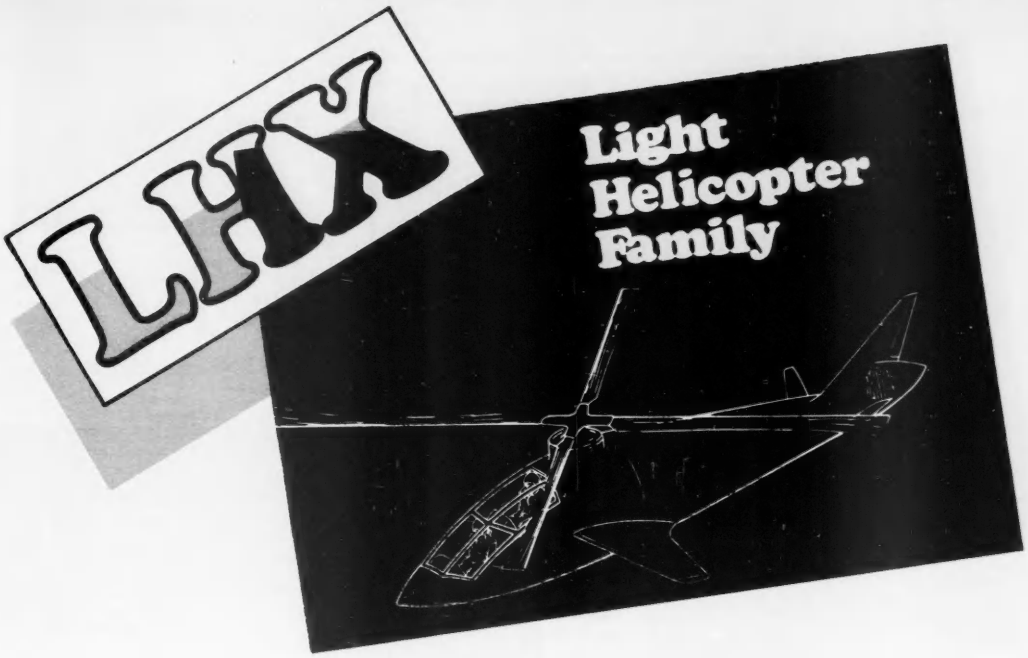
- *Commanders' information needs.* This area consists of the situation and target development processes necessary to support commanders' battlefield objectives. The LHX supports this category by providing an aerial platform capable of carrying sophisticated sensor packages with the ability to provide detailed terrain and weather information enabling the command to see and understand the battlefield better. It also supports commanders' information needs by detecting, identifying and locating enemy units and activities.
- *Commanders' operational needs.* This IEW support consists of OPSEC (operations security) and electronic warfare (EW). The LHX supports this category by providing OPSEC support platforms to identify friendly vulnerabilities as seen by the enemy, assess enemy capabilities to exploit these vulnerabilities and provide a platform for deception and jamming systems.

Army Aviation supports the **communications** operations of ALF commanders by providing aerial platforms for the transmission and reception of radio, video display and data communications. The LHX supports this functional area in several ways. Its design provides electromagnetic pulse (EMP) hardening and ECM resistant communication for uninterrupted capability. It provides for radio relay during deep attacks. It provides for rapid transport of communications support systems and it provides for time sensitive courier service.

Army Aviation provides increased capabilities in all the areas of **combat support, engineer and mine warfare.** LHX supports this functional area by providing ALF commanders the mobility to rapidly bypass obstacles. It also is capable of dispensing scatterable mines, which prevent the enemy use of avenues of approach but do not restrict friendly use. It provides a platform for dispensing wide area obscurants or for decontamination of large areas with aerially delivered sprays and foam.

Army Aviation enhances the **combat service support** efforts of the AirLand Battle force by providing highly flexible, rapid means to transport personnel and materiel anywhere on the battlefield. Army Aviation's inherent responsiveness makes it the ideal medium to move critical items of support to the user in the shortest time. The LHX will aid in this area by providing movement of all types of support over the battlefield. It provides long-range over-the-shore transport of supplies. As a transport aircraft it can provide for the reconstruction of forces by repositioning uncommitted elements.

The LHX will be the most versatile vehicle on the AirLand Battlefield of the year 2000. It will not only provide ALF commanders with a significant combat multiplier, but will give them a flexibility they have never enjoyed before. LHX is the Army's high mobility combat vehicle of the future.



Keeping Pace with Technology

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Glossary—Page 12

IT'S UNFORTUNATE, but the old phrase "you're not getting older, you're getting better" fails to hold true for aircraft. Much of the current fleet of light helicopters is fast approaching operational and tactical obsolescence, and will soon become economically and logistically unsupportable, and unsurvivable. Although procured in the 1960s and early 1970s, the fleet represents 1950s' technology. New and evolving tactical missions associated with the Airland Battle 2000 concept and an increasingly sophisticated threat serve to speed up the aging process. These evolving missions, such as helicopter air-to-air combat and deep attack operations, require technology and performance far superior to that of the current fleet. The Light Helicopter Family (LHX) will use currently evolving technologies to field high performance

FIGURE 1: Typical LHX VTOL configuration candidates

rotorcraft for the mid-1990s and beyond.

Some of the candidate configurations under consideration for the LHX are shown in figure 1. They range from a pure helicopter, the UH-60 Black Hawk, to vectored thrust, AV-8 (or XV-6A) Harrier, to achieve a vertical takeoff and landing (VTOL) capability. U.S. Materiel Development and Readiness Command (DARCOM), as the materiel developer, will select the exact configuration based on numerous studies and trade-offs with respect to standardization, survivability, productivity, maintainability and performance.

The technologies that will be discussed in this article can be seen in figure 2. The user's interest in these technologies relates more to the operational payoffs that can be achieved by their use than in the technology itself. U.S. Army Training and Doctrine Command (TRADOC), as the user, describes in general terms what operational characteristics are required in a particular end item. DARCOM translates these required parameters into a piece of equipment, using technologies it feels would best fill the requirement.

• **The Advanced Composite Airframe Program (ACAP)** is a technological effort that will demonstrate the advancements achievable through the application of fibrous composite materials, such as Kevlar, and advanced design concepts to the design of primary and secondary airframe structure. Program goals include demonstration of compliance with the crashworthiness requirements of MIL-STD-1290 and improvements in reliability, maintainability, vulnerability, safety and survivability while achieving a 17 percent reduction in airframe production costs and a 22 percent reduction in airframe weight when compared to a baseline metal airframe. The ACAP has the potential to

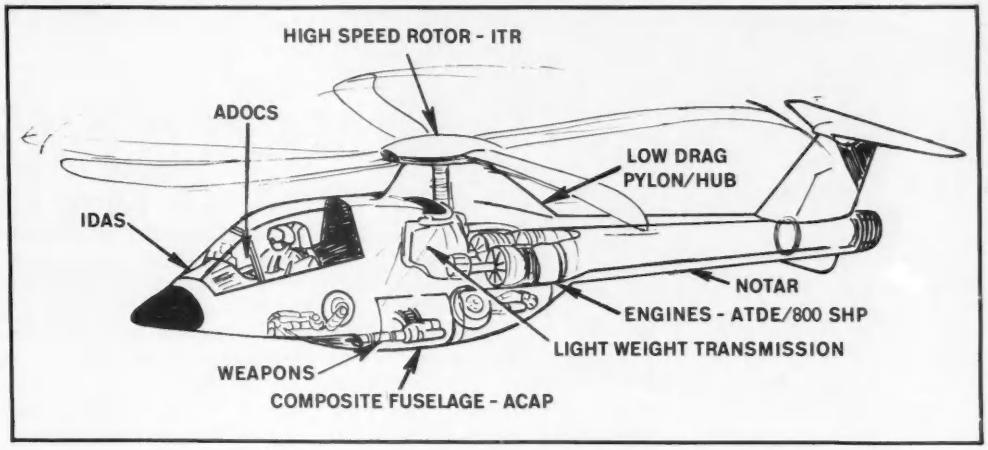


FIGURE 2: LHX related technologies

achieve laser burn-through resistance and be ballistic damage tolerant. It offers the materiel developer the opportunity to build low radar cross-section airframes at reduced costs over conventional metal designs. It is highly probable that reduced support costs also can be achieved. This is a desirable feature of any system or technology, as operational and support costs over the life cycle generally far outweigh the original costs of the system.

• **With respect to weapons** and weapons-related technology, weaponization studies are underway to determine weapons suited for both scout/attack (SCAT) and utility/observation aircraft. Some of the specific systems or capabilities that may be used on the LHX include the helicopter automatic targeting system (HATS) which can be used in conjunction with electro-optical remote view systems to increase target acquisition performance of airborne observers while decreasing aircraft exposure time. To improve operations in adverse weather, fire control/acquisition radar (HAWFCAR); helicopter adverse weather target servicing system (HAWTSS); and helicopter adverse weather target acquisition and destruction system (HAWTADS). Other areas of interest include precision aiming techniques, target sensing armament systems and enhancement of identification friend or foe (IFF) capabilities. Weapons such as turreted lightweight cannons, hypervelocity missiles and unguided rockets, air-to-air missiles and directed energy weapons are potential candidates for the LHX. Fiber-optic guided missiles (FOGM) will allow the gunner to be in full control of the missile from launch to impact. The helicopter acoustic receiver system (HEARS) has the potential to provide the crew with early cueing, direction of possible targets and classification of targets in any weather condition. Infrared acquisition and guidance is provided in forward looking infrared radar (FLIR) and focal plane array technology. Ultimately the weapons and target acquisition capability placed on the LHX will be a joint decision by both the materiel and combat developers. Studies are ongoing now to make just such determinations. The results of the completed studies will be used in the preparation of the requirements documents for the LHX.

• **The Integrated Digital Avionics System (IDAS)** will incorporate a digital architecture approach to the design of avionics systems using modular design and MIL-STD-1553 standard interface. This technology will use integrated control and displays and automation to reduce crew workload, weight and life-cycle cost. The user's interest in this technology is in the inherent mission flexibility and in the improved logistic supportability it offers in that electronic subsystems (radios, sensors, etc.) can be installed and/or changed individually (plug in—plug out) without having to change the whole system.

• **The Advanced Digital Optical Control System (ADOCS)** uses a fly-by-light flight control capability that offers significant improvements over a dual-mechanical system in handling qualities, reliability, availability and maintainability (RAM) and combat damage repairability, while decreasing weight and life-cycle costs. The materiel developer estimates that improvements in those areas will range from two to eight times better than a dual-mechanical

flight control system. This technology can offer survivability improvements through electromagnetic pulse (EMP) hardening, redundancy and reduction in multiple hit to kill probability. It can also offer pilot workload reduction through stability augmentation and handling qualities that may be needed for air-to-air engagements and nap-of-the-earth (NOE) flight.

• **The Integrated Technology Rotor Program (ITRP)** will demonstrate a reduction in RAM related failures (discrepancies should be fewer due to a reduced parts count and higher fatigue life of this approach compared to conventional designs) and a reduction in support costs through fewer line items to support and longer servicing intervals. In addition, survivability should be enhanced due to higher ballistic tolerance, and handling qualities should be improved due to the incorporation of more complex airfoil shapes to achieve improvements in control responsiveness.

• **The Advanced Technology Engine (ATE)** is an 800 shaft horsepower (SHP) engine which, in a dual configuration, is in the power class most likely required for the LHX. The program goals for this power plant include a 25 percent reduction in fuel consumption to enhance range and endurance, improved survivability through judicious placement of components, redundancy, hardening and reduced support cost requirements through modular design and improved RAM characteristics over engines of a comparable power class. Improved RAM will also enhance operational availability.

There are a number of additional related drive train/flight handling technologies or capabilities that are of interest to the user. These include the no tail rotor (NOTAR) which eliminates the need for a tail rotor, adaptive fuel controls to improve engine responsiveness to aircraft maneuvering, drag reduction programs and integrated drive trains which improve the main transmission and the drive train gears (between the engine and the main transmission) to allow the power turbine to enter the main transmission directly without a speed reduction. These capabilities and others will be assessed by the materiel developer (DARCOM) for application to the LHX. The combat developer (TRADOC) will participate in those assessments and influence their outcome by the preparation of the LHX requirement document(s) and by maintaining a close working relationship with the materiel developer so that there is minimal confusion concerning what is needed versus what can be delivered.

The technologies listed in this article are but a few of those being considered for the LHX. The LHX program is a well thought-out, coordinated, development effort using the best minds and the latest technology available to field an affordable, effective weapon system for the Army of tomorrow.

GLOSSARY

ABC	advancing blade concept
ACAP	advanced composite airframe program
ADOCS	advanced digital/optical control system
ATDE	advanced technology demonstrator engine (800 shaft horsepower)
DARCOM	U.S. Army Materiel Development and Readiness Command
FLIR	forward looking infrared radar
FOGM	fiber optic guided missile
HATS	helicopter automatic targeting system
HAWFCAR	helicopter adverse weather fire control/acquisition radar
HAWTADS	helicopter adverse weather target acquisition and destruction system
HAWTSS	helicopter adverse weather target servicing system
HEARS	helicopter acoustic receiver system
IDAS	integrated digital avionics system
IFF	identification friend or foe
ITRP	integrated technology rotor program
LHX	Light Helicopter Family
NOE	nap-of-the-earth
NOTAR	no tail rotor
PAT	precision aiming technique
RAM	reliability, availability and maintainability
SCAT	scout/attack
TRADOC	U.S. Army Training and Doctrine Command
VTOL	vertical takeoff and landing
EMP	electromagnetic pulse
MIL STD	military standards

ABOUT THE AUTHOR

When he wrote this article, Mr. Artis was a research and development coordinator with the Materiel Developments Division, Directorate of Combat Developments, U.S. Army Aviation Center, Ft. Rucker, AL. He has worked for the TRADOC System Manager for the Attack Helicopter; the Applied Technology Laboratory at Ft. Eustis, VA; and the Project Manager for the Black Hawk. His current assignment began in July 1982. He is Weapon Systems Manager for the Attack Helicopter.

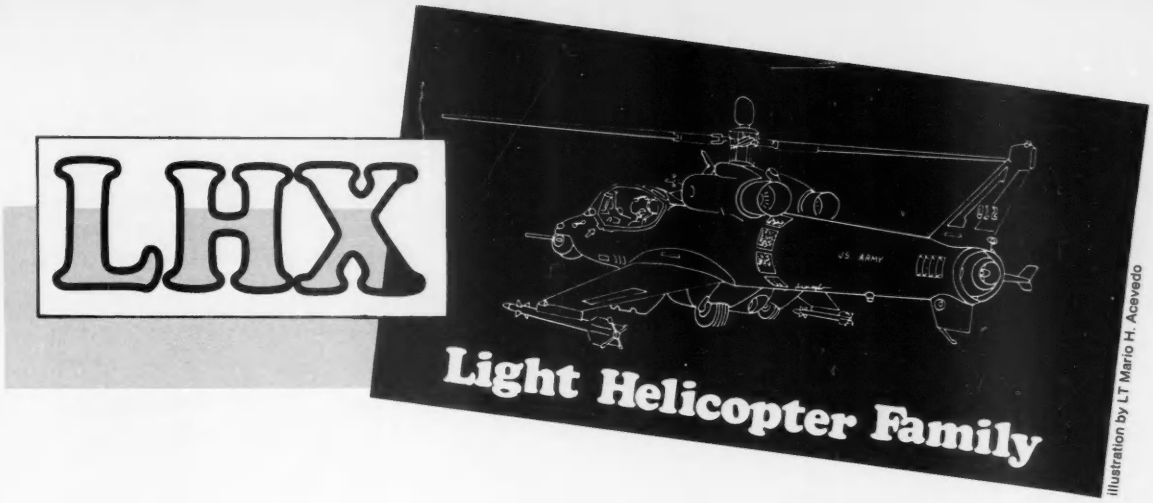


Illustration by LT Mario H. Acevedo

Sweet Dreams and Flying Machines

Major Michael L. Brittingham
Office of TRADOC System Manager
Attack Helicopter
U.S. Army Aviation Center
Fort Rucker, AL

GLOSSARY

ANS	American News Service
DTOC	Divisional Technical Operations Center
G	gravity
HE	high explosive
IR	infrared
LAPES	low altitude parachute extraction system
LHX	Light Helicopter Family
LNO	liaison officer
mm	millimeter
NAV	navigation
"six"	commanding officer
PCS	permanent change of station
RAW	radar warning
RDF	Rapid Deployment Force
RPM	revolutions per minute

FADE IN—ME, standing over to one corner of the DTOC. A stranger, a surly-looking man wearing a Mickey Spillane trenchcoat, dark glasses and a floppy hat pulled Bogart-style down over the top half of his face, materializes from nowhere, elbows his way past the Luftwaffe LNO and taps me on the shoulder . . .

STRANGER: Psst! Hey, buddy! Wanna buy a helicopter?

ME: Buzz off, creep.

STRANGER (Insistently grabbing at my sleeve): I think you'll like what I got here. (He pulls one side of his trench coat open, and there, neatly arrayed on the lining, are dozens of tiny helicopters, gleaming with reflected light from the Coleman overhead.)

ME (Indignant): You sleazeball! What do you think I am? Get away from me! (I jerk my arm away.)

STRANGER (Shrugging): Have it your way, buddy. I just thought you might be interested in this one ...a little sports job...racing stripes, mag wheels...look at those lines! This'll be a classic!

ME: Beat it! I'm not interested!

STRANGER: Or this hot little number . . .

ME: Out! (Reaching for my .38)

STRANGER: 300 knots top—in level flight, climb perf . . .

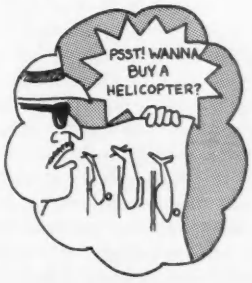


Illustration by 2LT Jay Jennings

ME (I pull back the hammer): I'm going to count to three . . . .

STRANGER: Climb performance better than 4,000 feet per minute (talking faster now), maneuverable from minus 1.5 to plus 5 Gs, goes from 0 to 200 knots faster than a commie can cry comrade! And . . . (he winks lewdly) it's fully aerobatic.

Me (Lowering the .38): Did you say minus 1.5 Gs?

STRANGER (Lowering his voice to a whisper and moving close to me): That's what I said, buddy, 1.5 negative, and it can dive at up to 450 knots, stop on a ruble and give you 86 kopecks change.

ME (My resolve gone now): Fully aerobatic, huh? (I think I drooled just a little.) When can you deliver?

STRANGER (Reaching into the inside pocket of his coat and removing a legal-looking document): Title, tags, dealer prep and fully integrated weapons system included. (I smile weakly, whimpering. He hands me a pen.) Right there by the X. I can have this baby for you in, oh, say, 6 or 7 years, OK?

ME (Scratching at the X with the pen): Did you say you'd work a good trade for a clean, late-model AH-1?

STRANGER (Opening the other side of his coat): An AH-1, you say? Buddy, I got AH-1s and AH-1s and more AH-1s, but . . . I'll see what I can do . . .

Fade out . . .

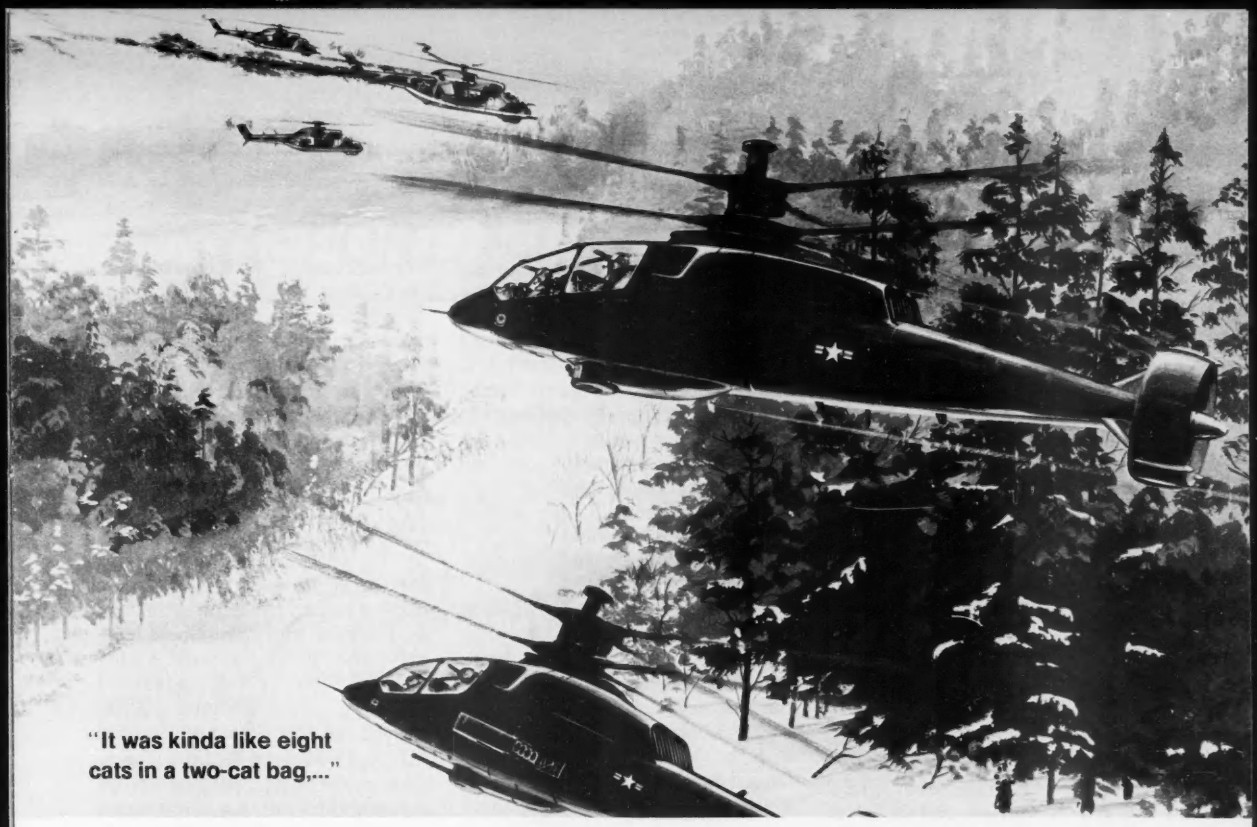
And I usually wake up chuckling. Because it wasn't so very long ago that I was a junior grade staff officer, putting my two cents' worth into the Army's efforts to buy a new helicopter. LHX—that's what they called the program back then, but you know all about that . . . how one common basic airframe provided the foundation for a whole family of helicopters—attack, scout, utility, pursuit . . . Oh, yeh! I almost forgot the growing pains Army Aviation went through before we finally got a "high performance" helicopter. But when you're an over-the-hill, hip-pocket-order-recall-just-til-the-war's-over lieutenant colonel, the memory isn't always so sharp.

There was a lot of excitement in Army Aviation back in the eighties, particularly in attack aviation. The AH-64 Apache, our basic work-horse tank-killer, was in the throes of birth. And what a glorious, noisy birth it was! Opposition was rampant, in spite of the fact that every test and training exercise showed the AH-64 Apache to be even deadlier to enemy armor than advertised. And when the nay-sayers had had their day, and the Apache was safely in production, there were a lot of us who felt content with the premise that if Army Aviation could kill tanks at will on the battlefield, the ultimate role for attack aviation would be realized.

You know the rest, too, I suppose—how a Soviet-sponsored Afghan-Iranian "incursion" across Southern Iraq (supposedly at the behest of the radical Kuwaiti "government" in exile) precipitated shipping the RDF posthaste to secure and defend the Kuwaiti oil fields. There had only been one serious attack mounted by the bad guys before reason prevailed and negotiation restored the shaky boundaries, but that one had been enough. Just 4 days after arriving in theater, both attack helicopter battalions found themselves committed to stop the major bad-guy attack along the Al Basrah-Umm Qasr axis. They handled the lead elements easily; in fact, the first echelon regiment was reduced to smoldering, twisted junk, and there we were, full of spit and vinegar, launching a full battalion (18 Apaches), thrusting deep to meet and destroy the second echelon regiment as it moved down from the foothills north of Dezful. Seems, though, that the bad guys had other ideas. Their Hind-Gs and our Apaches had arrived days before at a position of mutual respect, each of us having weapons *almost* adequate to blow the other away, and clearly adequate to make us both very, very thoughtful about "mixing it up" in a free-for-all. We were just about evenly matched in performance and firepower, and the name of our game was live to fight another day, and theirs must have been the same. Encounters between us were rare, and it was hard to tell who was the most cautious. But *that* day, they had other ideas.

Our scout screen had just cleared a low rise in the desert floor when the command net erupted in a flurry: "Bogies, ten o'clock, I count six . . . seven, eight . . ." "I see nine." "What *are* they?" And about then the air ahead of us began to sprout oily balls of smoke (about where the scouts were), and the command net got real quiet. My RAW gear was lit up like a Christmas tree (I'm sure everybody else's was too), and our fire control radars were going bonkers, so we switched on our own music, and went full visual . . . just in time to see these 8 or 9 (I swear it looked like 20) funny looking helicopters closing from our left front. The lights flashing under their noses weren't NAV lights, either, and while I only took one or two hits high through the canopy (I was glad they weren't HE), the bad guys left three of us down and out after they blew through the first time. Holy cow, they were fast! They were there, then they were gone, and three of us were down.

Who were those guys, anyway? *What* were they? About that time, I guess, the "six" decided that discre-



"It was kinda like eight cats in a two-cat bag,..."

tion and valor were relative and ordered a one-eighty, head for home and let's talk this over . . . just in time to turn nose-on to the bad guys who had turned back in (I supposed) to finish us off. This time, though, we hardly hesitated—we scattered like we were the citizens of Pamplona and they were the bulls as they blew through us one more time. Hah! Missed us, you bums! And there we were, headed in 15 different directions, and it all went downhill from there. Brother, as the saying goes, you ain't seen nothin' yet.

The debriefing later revealed almost a consensus that the evil intruders had two engines, two seats and funny looking rotor blades. But whatever they were, they were quick. Have you ever seen flies around a watermelon on the picnic bench? Well, we were the watermelon. Among the confusion I saw Mad Dog Hawkins and Dutch Holland, heading for home at top speed (and then some), casually overtaken by three of the bad guys and, poof! Mad Dog was a ball of fire and Dutch was on his way down, oscillating badly. I made a mental note to be sure and get Mad Dog's little black book out of his duffel before I turned in his stuff, and punched memory/present loc on my NAV box just in case somebody might have a chance to come back for Dutch. Then I heard the squall in my earphones, "three-four, check six!"

Somewhere from the cobwebs came a distant memory, "You can always do something worse than turn into the bogey," so that's what I did. Or at least that's what I tried. I think I was about halfway around when I heard my front-seater over the intercom, "Holy (expletive deleted)!" And just then, a small smoking telephone pole flashed through my peripheral field of view. (I later concluded that my turn had probably broken lock-on of some kind of IR missile.) Two new holes appeared in the canopy, and I tightened my turn, or at least I tried to. (It was a great day for nice tries.) My Apache shuddered and shook and started to fall out of the sky, my RPM warning came on, and I spent a second or two getting things under control. I finished at a very shaky hover, which probably saved my tail, 'cause the bad guy had overshot, and my front-seater had him in sight turning back in. I hoped he was alone. I guess he was. Anyway, my front-seater tossed some 30 mm his way while I did a variation of St. Vitus' dance trying to deny the bad guy a good gun solution; his tracers just floated up, and by, thank God, and here we went again. Variations on the same theme went on for about 10 minutes, I guess. All I was doing was annoying him, and it was almost all I could do to check the

rest of the "fight," and call bogies for my buddies now and then. He just wouldn't leave me alone long enough for me to build some forward speed and enough energy to do anything but duck. I did get one missile off at a bad guy who had somehow been spit out of the confusion, but I didn't have time to watch for the fireball. I must have had more holes than a swiss cheese, and my caution/warning panels looked like a Christmas tree, when the bad guys broke it off and bugged out. (Fuel state, I guessed. But if the spooks could find out where they came from that should tell us something about their endurance capability.) And we regrouped, or at least we tried to. Nine of us were still in the air. The "six" was down with five others, plus the three we'd lost at first contact, and an as yet undetermined number of scouts were in varying stages of destruction below. A line from an old song came to mind, "Sweet dreams and flying machines in pieces on the ground."

We still had a real problem. Our original plan had called for us to refuel once en route, from bladders that had been LAPES'd in the previous night. From where we were, getting home was going to be very dicey, considering the 10 or 15 minutes of max performance confusion we had just put ourselves through. And knowing that those things were out there made further progress on our as-filed route even less desirable, so we headed home and hoped for the best.

The Cav came out later and picked up the survivors. Three aircraft were recoverable, and the rest of us *almost* made it home before we ran out of fuel. So there we sat, dismounted, waiting for the war to do something around us. As it turned out, the cease-fire went into effect at sundown that night, and the next morning we were ignominiously craned onto lowboys and trucked—*trucked*, mind you—back to the rear! Three days later, the United Nations' cease-fire monitors found Dutch, cooling his heels in the Harem tent of some two-bit Bedouin chieftain who had a fondness for Anglo-Saxons that he'd picked up from his granddaddy who had fought with T. S. Lawrence. But the Swedish military police just couldn't swallow "Dutch of Arabia," so back he came. C'est la guerre.

Our recovery teams also brought back one of the bad guy helicopters (the only one down, it turned out). Sometime after our debrief we found out that they were . . . well, different. I won't bore you with the technical stuff, but the "spooks" finally confirmed that we hadn't been eating mushrooms when we reported helicopters flying at speeds of 300 knots or better, and doing things that no self-respecting helicopter ought to do. And we felt a little better, but not much.

A few months later, over coffee during an informal debrief back in the States with some high-level intel types, I was nonchalantly told, "Well, we *thought* they *might* have something like that, but we never could confirm it as a *real* threat."

I suppressed the urge to tear that guy's tonsils out, finished my coffee and left. I had a plane to catch later that afternoon, PCS to some place called Fort Tusi, NV, for instructor duty. (See "The Attack Helicopter School and Center of the Future," by Colonel David L. Funk, April 1982 *Aviation Digest.)* I could sure use a rest.

You know how it went from there—how we built and bought the LHX—pursuit, at least as good as (and we thought, of course, just a touch better than) those surprising beasts that just plain caught us with our pants down. But let me tell you, that's what I call development of new system requirements the hard way. And if any of you vodka-swilling copter jocks with the funny-sounding names are reading this . . .

Wait 'til next time.

DRESDEN (ANS). The allied command reported early this morning that elements of the American 57th Attack Helicopter Division scored a major victory in continued heavy fighting with retreating Warsaw Pact forces. While escorting the main body of yet another leapfrog air/land assault deep into enemy-held territory, the heavily armed, highly maneuverable PH-90 advanced fighter helicopters completely destroyed the elite Soviet 4th Guards Attack Helicopter Regiment as it attempted to intercept and disrupt the allied advance. American losses were termed "negligible." Shortly after the massive air battle, when asked by combat correspondents to describe the engagement, one of the 57th pilots, CW3 Frances Xavier "Wolf" Kranski, of Toledo, OH, replied, "It was kinda like eight cats in a two-cat bag, but those guys never had a chance. We were all over them like a dirty shirt. We outshot, out-turned and outran them all day long. That PH-90 is one helluva fine fighting machine."

All is reported quiet tonight east of Dresden.

Coming next month:

- ☐ "**Army Aviation's Entry Into The Future: The LHX,**" by COL Bob Fairweather
- ☐ "**Why Not An LHX?**" by Mr. Joe Cribbins
- ☐ "**Army Aviation Training Of The Future,**" by LTC Glenn Allen
- ☐ "**Concepts For LHX Cockpits,**" by LTC Russell Smith

DES Standardization Flight Evaluation Results, FY 1982

DES FLIGHT standardization teams conducted 2,605 standardization evaluations worldwide in fiscal year 1982. These evaluations included 2,103 no-notice flight evaluations of major Army commands, 53 U.S. Army Aviation Center evaluations and 449 oral-only evaluations. DES teams vary in size from about a dozen members, when evaluating major commands with numerous subordinate organizations such as USAREUR, to a single member when augmenting selected FORSCOM Aviation Resources Management Survey Teams.

The range in percentages and the pass/fail rates of the commands are the indicators of aviation capabilities as they relate to missions and resources available to the commands. Where the missions of the commands have a high degree of commonality, the results tend to be similar, as in the case of FORSCOM, WESTCOM, EUSA and USAREUR. Other factors must still be considered as affecting the results of the evaluations, and comparisons would not necessarily produce valid results. However, the results do offer the commands the opportunity to assess their aviation programs in light of their missions, and changes or adjustments to the direction of the programs can be more effectively implemented.

The accompanying figure indicates the results of all DES flight evaluations by aircraft type.

The results indicated in the figure should be used with caution. The better-than-usual results of the CH-47 and "other" types of aircraft should not be considered as an indication of aviator superiority in these types. Other factors must be considered. As an example, the UH-1 Huey, OH-58 Kiowa and AH-1 Cobra are evaluated with considerable emphasis on tactical scenarios, nap-of-the-earth and Night Hawk/night vision goggles operations, while the CH-47 Chinook and "other" are not evaluated in these modes. Another factor to be considered is the fact that CH-47 and "other" units do not, generally, receive first assignment aviators as part of their personnel complement.

The results shown in the figure can be useful to commands and commanders for planning purposes. As an example, the results by aircraft can be used in forecasting aviator proficiency requirements or setting of goals for subordinate units.

Results By Aircraft

AIRCRAFT	SAT	% SAT	UNSAT	% UNSAT	TOTAL
UH-1	700	85.9	115	14.1	815
OH-58	355	81.1	83	18.9	438
AH-1	190	81.9	42	18.1	232
CH-47	149	93.7	10	06.3	159
OTHER	402	87.6	57	12.4	459
	1,796	85.4	307	14.6	2,103

GLOSSARY

DES	Directorate of Evaluation and Standardization
EUSA	Eighth U.S. Army
FORSCOM	Forces Command
USAREUR	U.S. Army, Europe
WESTCOM	U.S. Western Command

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hot Line, AUTOVON 558-6487 or 205-255-6487 and leave a message

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Kim Aguilera photo by Tom Greene

Magnesium Batteries

This is another one of those "gray" areas but we are passing it on to you via PEARL. A recent Communications and Electronics Command (CECOM) safety advisory message was transmitted to the field but in the event you have not seen it we summarize it herewith: Magnesium batteries are not disposed of in the proper manner in all cases. These batteries are hazardous material and should be turned in to your local defense property disposal office (DPDO). All future procurements of magnesium batteries will be labeled with the proper disposal instructions. For batteries already manufactured and in use, the disposal instructions are as follows: Do not throw away or dispose of as trash; turn in to the DPDO for disposal. Point of contact for CECOM is Susan Hill, AUTOVON 992-4437 or Commercial (201) 532-4437.

Aviator Sunglasses

In response to the many requests for replacement parts for the aviator sunglasses we did some research and came up with the following: National stock number (NSN) 6540-00-926-9013 temples only (gold) has been deleted and replaced by: (1) NSN 6540-01-099-2321 (bayonet type). This is the complete eyeglass frame in a dull chrome color. (2) NSN 6540-01-096-4496 (cable type). This is also the complete eyeglass frame with the curved adjustable earpiece. These may be ordered from RIC-S9M-DPSC (Defense Personnel Supply Center), Director of Medical Materiel, 2800 South 20th Street, Philadelphia, PA 19101. Point of contact for this office is Mr. Tommy Vaughn, DRCPO-ALSE, AUTOVON 693-3307.

Questions on ALSE

Dear PEARL, I have been working in aviation life support equipment (ALSE) for about 9 months and have found many questions about the field left unanswered. I am submitting some of these questions in hopes that I might finally find an answer.

My first questions are about the SPH-4 helmet. I have discovered many helmets that have had the elongated hole used to mount the microphone boom rounded out. This causes the boom to keep moving and a slight damage to the helmet shell. What is the status of the helmet? Is it still considered serviceable or is it condemned due to damage to the shell? Second, how deeply can the shell be scratched before it is considered unserviceable? Also, when I remove the liner from some shells they appear to be very thin, the shell that is, sometimes to the point I can see light through them. What is the status of these helmets? I have heard that there is a new ALSE supplement to AR 91-1. If so, what are its provisions and when will it be out?

Why is all the information on life support equipment so scattered? Why not write a set of manuals similar to aircraft manuals to include parts manuals? I am having trouble receiving replacement items for my survival kits; is there a total shortage of these items in the supply system or is it just Europe?

I have many more questions but these are my major ones. I will be waiting for your answer with great anticipation. (SGT Steven F. Klauk, ALSE NCOIC, C Company 8th CAB, 8th INF DIV, APO NY)

Dear SGT Klauk: Due to your numerous questions we decided to share them and our answers with the entire ALSE community.

In reference to your questions on the SPH-4 helmet:

- If the elongated hole used to mount the microphone boom is rounded out to the extent that the microphone boom can no longer be securely fastened to the helmet shell, the helmet should be disposed of.
- Surface or paint scratches in the helmet do not constitute a major defect and should not render the helmet unserviceable. However, any scratch, which in your judgment is deep enough to weaken the shell, should be cause for disposal of the helmet.
- Current specifications state that the crown area of the helmet shell shall be a minimum thickness of .080 inches. If the helmets that you have appear to be very thin, to the point that they would not afford much physical protection for the pilot, it is recommended that you submit a quality deficiency report (QDR) to HQ TSARCOM, DRSTS-MCFT, 4300 Goodfellow Blvd., St. Louis, MO 63120, identifying the helmet with the appropriate contract number. You are further advised that Defense Personnel Supply Center, the manager of the helmet, dispatched a worldwide message. This message advised all users of the SPH-4 helmet that if they have helmets manufactured by AQUAIR on contract number DLA-100-80-C-2226, they should be reported to DPSC for full credit. This recall was based on excessively thin helmet shells.

The new aviation life support equipment system program regulation AR 95-XX encompasses all that is in AR 95-1 pertaining to ALSE plus more exacting guidelines in the life support area. It should be out to the field in 4 to 6 months. In the meantime you should rely on AR 95-1 and TC 1-62 as your guidelines.

Concerning life support manuals we agree with your idea and this is our ultimate goal. There are presently two manuals in draft, one concerning ALSE maintenance and repair and the other concerning ALSE operations.

With the fielding of the new ALSE regulation the proper command influence will be placed on ALSE. This will allow the correct demand data input to the supply computer which will then allow you to order your supplies with a stockage on hand so you won't always get a "due out." Until this occurs, however, we will just have to make do with the present system.

I know things sound rather bleak, but don't get discouraged—things are taking off in life support and we want you to be there to see it happen.

Improper Safety Ties

Another of the military services has again reported improper safety ties on LPU aircrew life preservers. Prior to the next flight using LPU aircrew life preservers, operating activities should inspect their preservers to ensure they have the proper safety ties. We strongly recommend that users review the technical orders, NAVAIRs (Navy manuals) and technical manuals for the proper safety ties. We do not know how this happened but we find that where adequate trained personnel are assigned we have less of a chance of this "revolting" discovery. Point of contact for this office is Mr. Ed Daughety, DRCPO-ALSE, AUTOVON 693-3307.

Fire Extinguishers

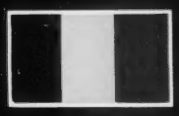
Dear PEARL, we would appreciate your help in resolving a problem concerning fire extinguishers. TM 55-1500-204-25/1, paragraph 1-67 (1)(f) is quoted: "Station a crewmember, equipped with a 50-pound carbon dioxide or equivalent fire extinguisher, in view of operator and to one side near rear of engine being started, to observe for fire and fire hazards such as fuel from overflow lines, etc., and to observe for chock slippage. This same crewmember will make periodic visual checks for fuel and oil leakage and other irregular conditions."

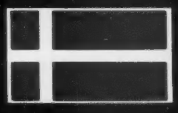
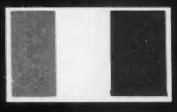
Our question is this: What is considered an equivalent fire extinguisher? We have been told that the 16-pound Halon type extinguisher is considered an equivalent. And also the 7½-pound dry chemical extinguisher accomplishes almost the same as the 50 pound. What can we legally use?

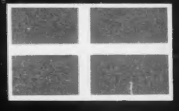
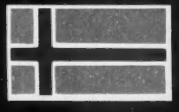
Your question must perplex others too, and although this is another one of those gray areas, we will try to give the information needed. According to our experts here, you are correct on one point. The 16-pound Halon type extinguisher is the only authorized equivalent to the 50-pound CO_2 extinguisher. It is managed by the Air Force, NSN 4210-01-092-3263 LS, and should be ordered off-line. The Halon extinguisher is noncorrosive to the aircraft and thus does not damage it. The 7½-pound dry chemical extinguisher should not be used as it is corrosive to aircraft engines. Point of contact is 1LT Greta Weaver, DRCPO-ALSE, AUTOVON 693-3307.

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120 or call AUTOVON 693-3307 or Commercial 314-263-3307

RSI Report



AN INDEPTH description of the Army's rationalization, standardization and interoperability program was presented in the September 1981 issue of the *Aviation Digest*. Since that time, several articles entitled the RSI Report have appeared. These articles have highlighted the accomplishments of international working parties/groups that are of interest to helicopter users.

Unfortunately, when standardization agreements (STANAGs) and quadripartite standardization agreements (QSTAGs) are ratified, aviation units have little, if any, immediate exposure to these agreements. The normal procedure is for each Training and Doctrine Command (TRADOC) school/center to incorporate the contents of each document into their proponent literature. Several years may pass before the terms of the agreement become the standing operational procedure for an aviation unit. In an attempt to familiarize aviation units with the contents of standardization agreements, the *Aviation Digest* will print selected STANAGs and QSTAGs. The most recent agreement to be ratified by the nations is STANAG 2861, Procedures in the Event of Downed Helicopters.

Units which are subject to this agreement are encouraged to validate the content of the STANAG. As a signator to this agreement the U.S. Army is required to abide by the terms of the agreement. If there are terms of the agreement which should be amended, recommended changes can be submitted. These proposals will be discussed at the next meeting of the Helicopter Interservice Working Party (HISWP).

To ensure interoperability among national forces, it is incumbant upon all nations to adhere to the terms of each agreement. The results will be an effective fighting force that will deter aggression by a hostile nation.

STANAG 2861—Procedures In The Event Of Downed Helicopters

1. *Aim:* The aim of this agreement is to standardize the immediate action and priorities in the event of a downed helicopter during an operational mission.

2. *Agreement:* Participating nations agree to adopt the procedures set out below.

3. *General:* This agreement is intended to provide a common procedure for the recovery, security or destruction of downed helicopters. In combat operations recovery of downed helicopters and crews is secondary to mission accomplishment by the whole force.

4. *Procedures:* The procedures to be followed in the event of a forced or crash landing will depend on the intensity of the threat and organic capability of the aerial force. The proximity to the line of contact will dictate the amount of time which is available to recover the crew and helicopter and the threat under which the recovery may be attempted. The organic capabilities of the aerial force will dictate whether recovery can be attempted.

5. *Premission Planning:* Prior to departing on a combat air operation, the air-mission commander will brief the aircrews on the downed aircraft procedures. Information that will be discussed includes:

   a. The location of rendezvous points for downed aircrews.
   b. Procedures for providing assistance for downed aircraft.
   c. Identification, search and rescue procedures.
   d. Identify on-call supporting units that will provide aircraft recovery and security for the downed aircraft.

6. *Actions and Procedures In The Event Of A Downed Helicopter:*

   a. Low threat area

      (1) In this area the commander of the aviation unit should:
         (a) Immediately determine the extent of damage/injuries through direct communication or reconnoitering.
         (b) Notify controlling headquarters of situation and request assistance as required.
         (c) If capable, evacuate injured personnel.
         (d) Continue mission.
      (2) When possible, the aircraft commander of the downed helicopter should:
         (a) Remove/secure/destroy critical items, such as classified material, weapons, ammunition and any other sensitive equipment.
         (b) Administer first aid, as necessary.

(c) Contact the aviation unit commander on the emergency radio.
(d) Assist in the recovery operation from the ground.

b. High threat area

(1) When possible, the aviation unit commander should:
(a) Determine extent of damage/injuries through direct communication, or, if time and mission allow, direct reconnaissance.
(b) Report situation to appropriate authority and request assistance if appropriate to battle situation.
(c) If able, evacuate injured, if not request ground force assistance.
(d) If the flow of the battle allows and mission is not degraded, evacuate all personnel when able.
(e) Continue mission.

(2) The aircraft commander of the downed helicopter should:
(a) Accomplish those tasks in paragraph 6.a.(2)(a) through (d) above.
(b) Secure immediate area around aircraft.
(c) Prepare aircraft for destruction on order.
(d) Move personnel to rendezvous point or nearest friendly unit when ordered.

c. Across the forward line of own troops (FLOT)

(1) The aviation unit commander must preplan, as much as possible, actions to be taken in the event of downed helicopters.

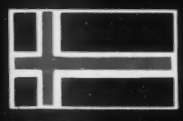
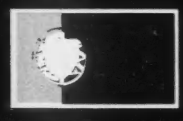
(2) During a mission the aviation unit commander will, if able:
(a) Determine casualties from downed helicopters.
(b) Record location.
(c) Notify controlling headquarters and/or nearest ground force, but only when such communication is permitted or feasible.
(d) In event crew is unable to destroy helicopter, arrange for destruction.
(e) Attempt evacuation of personnel ONLY if it does not hamper mission accomplishment and will not unnecessarily endanger more aircraft.
(f) In all cases, continue mission.

(3) During a mission across the FLOT, the aircraft commander of the downed helicopter will, if able:
(a) Report situation to commander.
(b) Evacuate aircraft and, unless otherwise ordered, destroy it and all sensitive equipment.
(c) When advised by rescue personnel, move to nearby landing point.
(d) If not immediately evacuated, proceed to preplanned pickup spot or follow preplanned escape and evasion plan.

7. *Actions By The Owning Unit:* The controlling headquarters of the downed helicopter should be prepared to accomplish the following actions upon notification if the tactical situation permits:
a. Arrange for appropriate forces to provide security for the downed aircrew and helicopter.
b. Dispatch recovery personnel and equipment required to recover the helicopter.
c. Initiate rescue operations for recovery of the downed aircrew.
d. When aircraft cannot be recovered, authorize the aircraft to be destroyed.

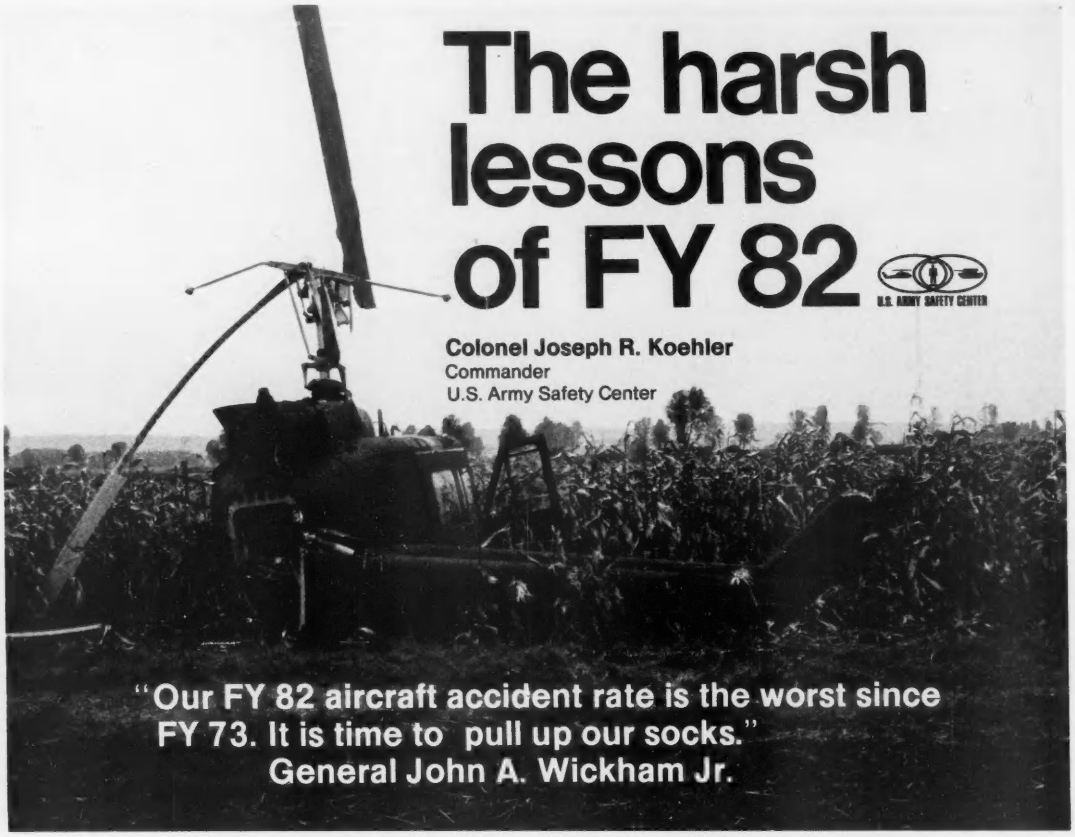
8. *Reports:* Reports on downed helicopter situations must be concise and accurate.
a. Identification
b. Location
c. Personnel injured, personnel able to continue mission
d. Estimate of aircraft damage (total, major, minor)
e. Existence of evidence of chemical contamination
f. Enemy situation, to include the air defense artillery threat
g. Accessibility to downed helicopter
h. Intentions

If this article has generated any questions or requirements please contact Mr. Rush Wicker by writing: Commander, U.S. Army Aviation Center, ATTN: ATZQ-D-CC, Ft. Rucker, AL 36362.

The harsh lessons of FY 82

Colonel Joseph R. Koehler
Commander
U.S. Army Safety Center



"Our FY 82 aircraft accident rate is the worst since FY 73. It is time to pull up our socks."
General John A. Wickham Jr.

OUR AIRCRAFT accident record for fiscal year 82 is now history—a record that will leave an indelible scar on all Army aviators for years to come. In FY 82, we managed to kill 46 Army personnel and 40 non-Army personnel, injure 95 crewmembers and passengers, and destroy 48 aircraft, at a cost to the Army of more than $62 million.

Human error on the part of aircrews and supervisors was the root cause of the sharp increase in Class A aircraft accidents in fiscal 82. A review of Army aircraft accident experience over the past 5 years—FY 78 through 82—shows that 71 percent of all Class A, B and C accidents involved human error. Environmental factors accounted for 15 percent and materiel 14 percent.

A breakout of the human error cause factors shows that flight crew error accounted for 80 percent of all human error mishaps; supervisory errors, 10 percent; ground crew, 5 percent; and other personnel, such as air traffic controllers, 5 percent.

Contrary to popular belief, it is not the young inexperienced aviator fresh out of flight school who is causing the crew error problem. Statistically speaking, it is the relatively experienced aviator, the captain or CW2 who has been out of flight school for about 6 years and has about 1,000 total flight hours.

Also, it is not the high-risk NOE flight operations causing the recent rise in accidents. In fiscal 82, only five of the flight crew error accidents were the result of operating in the NOE mode. It is the single-ship mission that is causing the problem—aviators operating out of home base, on their own, without supervision.

The recent increase in aircraft accidents can be linked to a breakdown in flight discipline on the part of individual aviators and a tendency toward complacency on the part of certain commanders.

A breakout of the top five aircraft system problems over the past 5 fiscal years which caused

the human error accidents shows that psychological factors; that is, motivation, attention, judgment and overconfidence, accounted for 40 percent of the accidents.

Inadequate unit training ranked second, accounting for 13 percent. Inadequate written guidelines, equipment design and maintenance accounted for the remaining 18 percent of the human error accidents.

What this says is that more than half—53 percent—of the system problems causing our human error accidents are at a level which is directly influenced and controlled by the commander. The Safety Center can do something about system inadequacies, such as written guidelines, equipment design and maintenance; but we must look to commanders for the correction of substandard aircrew performance and inadequate unit training.

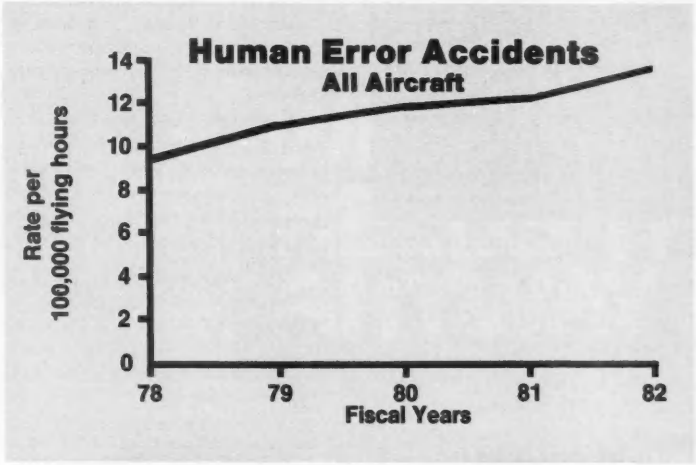
Powerful tools

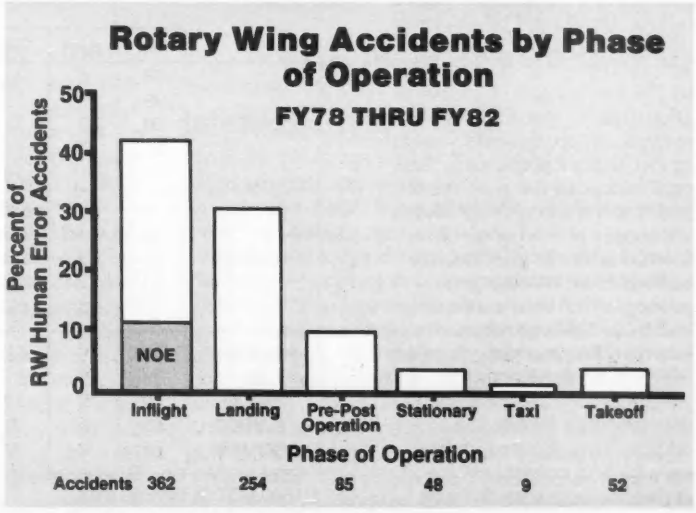
Commanders have several powerful tools to use to reduce crew accidents.

- Improve upon direct supervision of all flight operations through personal involvement.
- Renew your emphasis on discipline of aircrews and require them to operate the aircraft according to regulations and established procedures.
- Record unsafe acts and violations of regulations and relieve aviators from flying duty for flight discipline infractions.
- Enforce and give visibility to the crackdown on aviation personnel abusing alcohol and drugs.
- Make aviation training and safety a matter of personal involvement and high priority. It is a proven fact that whenever a well-run unit training program is in effect, the accident rate is low.
- Ensure that units conduct missions within the boundaries of contemporary concepts, doctrine and tactics.

Now, let me review for you a few of the more flagrant violations of flight discipline and/or supervisory deficiencies.

- A UH-1V pilot picked up an injured civilian and departed for the hospital. He flew down a river with high cliffs on each side. The aircraft completed a steep right turn and then rolled into a steep left turn. The combination of high airspeed and steep banks resulted in the aircraft losing altitude. The main rotor blades hit the top of a tree, control was lost, and the aircraft crashed into a rock cliff. Result: destroyed aircraft, five fatalities, and $1,428,000 in losses.
- A pilot flew his UH-1H helicopter at cruise airspeed about 100 feet above a bay. The aircraft hit two wires which severed the tail rotor drive shaft. The pilot flew the aircraft about one-half mile to the shore and tried to make an emergency landing. He allowed airspeed to dissipate to the point that the air-





craft went into a spin and crashed on the shoreline. Prior to this accident, the pilot had been placed before an FEB on one occasion and reprimanded on another for unauthorized low-level flight. Result: destroyed aircraft, three major injuries, one minor injury, and $949,000 in losses.

• A UH-1 pilot failed to make sure the left side engine cowling was secure. The cowling came off during flight and hit the tail rotor. The tail rotor blades and hub assembly separated from the aircraft. The pilot entered autorotation and the UH-1 landed hard. The pilot failed to recognize the loss of tail rotor thrust and reacted to a nonexistent engine failure. He did not try to regain powered flight and began an autorotative deceleration at 125 to 150 feet instead of 75 feet in accordance with the operator's manual. Approximately 7 months before this accident, an IP had recommended the pilot receive additional training in simulated antitorque procedures. Two months later the pilot failed a written exam on emergency procedures. About a month and a half before this accident, the pilot was involved in a minor accident in which he demonstrated faulty judgment. It was determined at that time that he needed additional supervised flight training and counseling. No action was taken by the unit commander to provide the additional training or upgrade the pilot's knowledge of emergency procedures. Result: destroyed aircraft, one major injury, and $620,700 in losses.

• An OH-58 pilot picked up some passengers from a field site and climbed to about 85 to 90 feet agl. The speed of the aircraft was estimated to be faster than a hover and slower than normal cruise. The pilot made a tight right turn, and the aircraft began to spin to the right. After spinning about six times, the aircraft crashed into trees. This accident was caused by inadequate tail rotor thrust for flight conditions and gross weight and by the pilot performing a maneuver conducive to loss of tail rotor effectiveness. The loss of tail rotor effectiveness was not covered by the instructor pilot during the pilot's transition into the OH-58. The pilot had completed his OH-58 transition training just two weeks before this accident. Result: destroyed aircraft, one fatality, three major injuries, and $483,000 in losses.

We can certainly do better than this, and we must. In a nutshell, there is no excuse for doing the dumb things that we did in FY 82. And it's the responsibility of every commander, aviator, crew chief, maintenance person, traffic controller—to name just a few—to put a stop to this kind of horrible record. It can be done and you can do it if you'll just remember what you were taught during training and fly the way you were taught to fly. As General McNair has stated: "Let's be accident free in 83."

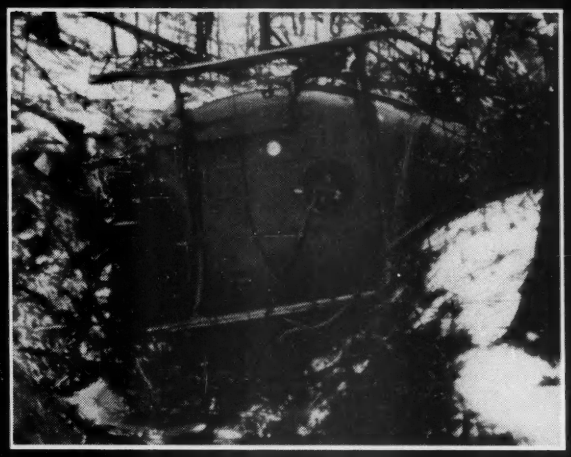
CLASS A AIRCRAFT ACCIDENTS

	FY	AH1	UH1	UH60	CH47	OH58	OH6	OV1
ACCIDENTS	78	4	25	*	0	7	3	2
	79	5	12	0	5	9	0	2
	80	5	13	0	4	12	0	2
	81	7	19	2	2	9	1	1
	82	10	24	4	2	13	3	2
RATE	78	5.23	3.39	*	0	2.41	10.14	9.33
	79	5.96	1.64	0	9.71	3.15	0	9.26
	80	5.57	1.67	0	7.72	4.26	0	9.39
	81	7.04	2.32	5.93	3.52	3.06	2.67	5.05
	82	9.21	3.26	8.07	3.63	4.46	9.08	11.08
PERCENT OF TOTAL FLYING HOURS	78	5	51	*	4	20	2	1
	79	6	51	1	4	20	2	1
	80	6	51	1	3	18	2	1
	81	6	50	2	4	18	2	1
	82	7	47	3	4	19	2	1

*UH60 NOT IN INVENTORY

MONTHLY WRITING AWARD

The accident discussed by the author and shown below occurred substantially as described. The crew of the aircraft consisted of John, a unit instructor pilot, flying the aircraft as copilot in the left seat; Bill, the pilot, navigating from the right seat; and Don, the flight's instructor pilot in the "jump seat" behind the radio console. The author was not aboard the aircraft, but describes the flight first from the copilot's point of view, and then later from the instructor pilot's to reflect their actions and reactions to the events of the flight



CW3 William W. Shawn
ARNG Multi-Media Training Group
Fort Rucker, AL

WHO NEEDS IT ANYWAY?

IT WAS A COLD clear day with patches of white remaining from a recent snowfall. As I flew from the left seat, Bill served as pilot and navigator from the right seat. Don, the instructor pilot (IP) for the flight, monitored everything closely from the "jump seat" behind the radio console. The 30-minute flight to the training area had been uneventful, and we were now halfway through the nap-of-the-earth (NOE) route. To this point everything had gone like clockwork, but presently Bill's face reflected questioning and doubt.

As he looked back and forth from his map to the terrain our IP realized he was unsure of our position. "All right Bill, do you know exactly where you are?" asked Don from behind us. "I think so. We should be just about here, just before this small creek on the map." "Well, look closely at the terrain around you and verify if that's true." After scanning the area again and looking at his map, Bill realized he had directed me up the wrong draw. "OK, now that you know where you are, just return to the course and start again."

Although the old aviation saying, "hours and hours of boredom, broken by moments of stark terror," may not be as applicable to helicopter pilots as to fixed wingers, and especially not during NOE flight, in just seconds the last part of that old saying would be appropriate to the three of us.

Midway through a right pedal turn, 10 feet above the trees, a sickening shudder shook the UH-1M Huey airframe. "You better get this aircraft on the ground now!" Don shouted from the jump seat, but all I could see below me were trees. A clear area was not far away so I applied cyclic to reach it. At almost the same time a loud bang came from the rear of the aircraft followed by the nose pitching down, a right roll and a rapid spin to the right. "Tail rotor failure!" shouted Bill. The pedals had no effect, so I rolled the throttle off and applied aft cyclic to level the aircraft.

WHO NEEDS IT ANYWAY?

continued

"My God, we're still spinning," I thought as I pulled collective to cushion us into the trees.

All I could see outside the cockpit was a blur of limbs and patches of white and brown. An extremely noselow attitude still existed, and I instinctively threw my head back as I saw a tree aiming for my windshield. My next memory was of the crew from the safety and control (S&C) aircraft assisting me from the ground. I also remember asking Don if he was all right as he was loaded on the aircraft but remember nothing more until I saw the nurses above me in the hospital emergency room.

Although John's memory of the crash is limited, he was conscious when the sounds of breaking limbs, bending metal and shattering plexiglass ceased in the bottom of an 8-foot deep, dry creek bed. All three crewmembers were trapped in the aircraft when it came to rest on its right side. In the pilot seat, Bill was totally pinned and unable to move. His right knee was pressed against his chin; his helmet was trapped between the cabin roof and his seat; his right arm was pinned by his body against the seat; and the hood of his winter jacket was caught between the seat and the airframe. In the jump seat, Don's left leg was trapped between the copilot's seat and the center console. The aircraft was so compressed on its right side, however, that he could place his right foot on the ground outside the cargo door. John was the least pinned of all and was the first one to exit through what once was the left windshield. The fact that all three Guardsmen survived the crash is somewhat of a miracle when the almost total destruction of the cabin area was considered.

The lapses of memory by the copilot apparently resulted from a blow to the head by the tree approaching his windshield. Bill, the pilot, also experienced a memory loss due to a concussion. To describe the crew's actions on the ground, the following events are as recalled by the IP.

Suddenly everything was quiet except for the engine running at flight idle. Bill's helmet was wedged between his seat and the cabin roof, so he unsnapped his chin strap and pulled out of it. John was mumbling and asking for help, and blood was dripping from his face. Someone took the PRC-90 from John's vest; but since it wouldn't work, it was laid aside in the cockpit. I then started trying to free my left leg that was pinned against the center console. The engine now began coasting down from fuel starvation, but the glaring master caution and segment lights indicated the battery was still on. The smell of JP-4 filled the air, and all of us became concerned about the possibility of a fire erupting. We tried to turn the battery switch off, but the overhead console could not be found! Bill was still trapped by his pinned flight jacket hood, and he asked me to cut it off with my survival knife. With that done he could move a bit in his seat.

By now John had freed himself and we lifted his seat off of my leg. John then exited through what once was his windshield, and Bill and I followed. Our first concern was to get away from the aircraft in case of fire. John, who had suffered a broken leg, was helped up the small hill we were on by Bill—while I, having also suffered a broken leg, began scooting backwards on my hands dragging my leg behind me. I soon felt Bill grab my jacket and start pulling me to where John was sitting.

I then tried to make contact with the S&C bird with our second survival radio. Having no success, I directed Bill to go higher on the hill and try the radio from there. The S&C aircraft had not seen us crash and was searching for us in the general area. Due to the wreckage blending in with the ground and almost being hidden in the creek bed, we could hardly recognize it ourselves from the ground. Bill was able to establish contact with the second ship and began directing it toward us. I carried an MK-13 flare with me, and I ignited its red smoke end when I heard the S&C bird. I also took the combat casualty blanket from my vest and laid it out with the international orange side facing up. The crew of the S&C first saw my smoke, and then my blanket and then began circling for an approach. In a short time the crew-chief, who was an emergency medical technician, was administering to our injuries as we flew to medical facilities.

As this article is written, one of the three crew-members has returned to full flight status, with the remaining two expected to regain that status in the future. It is obvious from the copilot's and instructor's statements that their situation was rather grim as they lay on their sides in the cockpit. Everyone had been violently thrown about the aircraft during its descent and impact with the dry creek bed. Each aviator was

flying, as they should have been, with their helmet's clear visor down. Each helmet received severe blows from the cockpit environment, and in the case of the copilot's, probable contact with a tree. Although each helmet shell was gouged and broken, all three visors remained intact. The copilot credits his visor with saving his sight, for although it was flattened against his face and broke his sunglasses (the source of blood seen dripping in the cockpit), without it his injury would undoubtedly have been worse.

Had any of the helmets' retention systems failed, resulting in a helmet loss, the outcome would undoubtedly have been tragic. Ironically enough, an aviation life support equipment (ALSE) specialist had rebuilt one of the helmets just weeks earlier and had made a recommended modification to two of the three chin-strap assemblies. We know from this crash that the helmets did their jobs, but what about the other life support equipment carried by the aviators?

Without a survival knife the pilot would have been held firm in his seat by the hood of his winter flight jacket. He had the small pocket knife that comes with the survival vest, but he was unable to reach it with his free hand and had to depend on his instructor and his knife.

Remember the first PRC-90 that didn't work? In fact it did work, but the selector switch had been placed in the beacon mode, so no transmissions could be made. Two civil aircraft received the beacon and began "homing" to the site after the S&C aircraft had evacuated the men. So well hidden was the aircraft in the creek bed that even though the aircraft navigated to the crash scene, they could not spot the wreckage below them for hours.

This fact points out the importance of the smoke released by the instructor (though not an item normally carried by crews), which was first seen by the S&C crew, and then the casualty blanket which pinpointed their position. The second PRC-90 radio also worked as it was designed to and allowed communications to be established between the crew and the S&C aircraft. All of the survival equipment that aviators are required by regulations to have, to be maintained and to be worn, performed as intended on this flight.

The title of this article is "Who Needs It Anyway . . . ." The answer is *you do* if you ever fly as a crewmember. You may have been on flight status for years, just as these three aviators, and have never needed or used it before. But just like them, *you may need it on the very next flight you take.* Do you have the equipment you are supposed to have? Is it checked out and properly maintained? Do you wear the survival vest as it is designed to be worn, or do you leave it lying in the cargo compartment in your helmet bag or hanging on your seat back? (None of the men in the crash above could find their helmet bags after the crash.) If you answered any of these with a "no," then you probably believe "Who Needs It Anyway..." is a valid statement. In that case it's a shame you can't talk to the pilots you just read about, for I know *you'll never convince them!*

CONNECTION

ACTAAT

Aviation Center Training Analysis and Assistance Team

WO1 IP?

ISSUE: Several personnel stated that they had heard of a new program through which warrant officers (WO1) could become instructor pilots (IPs). They were interested in this program and would like to know more about it.

COMMENT: There is no "new" program per se through which WO1s can become IPs; however, there is nothing restricting a WO1 from becoming an IP. The same guidelines in AR 95-1, paragraph 6-12, are applied to everyone regardless of rank. It is also possible for warrant officer candidates who show outstanding abilities to be selected to remain at Ft. Rucker and become "turnaround" IPs. They must first obtain 500 hours in the appropriate aircraft by conducting local support missions. This is the same program offered to commissioned officers. (Directorate of Training and Doctrine)

VIEWS FROM READERS

Editor:

I collect helicopters on postage stamps for display and exhibition. Would be interested in contacting any philatelists with same hobby.

MAJ Jack R. Treutle
47 Saint Cloud Street
Keyser, WV 26726

Editor:

Please forward me one copy of Major William C. Wood's article "Operational Aspects of Stress and Fatigue" which appeared in the September 1976 issue of the *Aviation Digest.*

Thank you very much.

CPT Thomas P. Finley, USAF
Andrews AFB, MD

Editor:

Could you please help me gather information on helicopter air-to-air combat tactics? I've read "Cobra Vs. Hind" and "Smart Guys Win" and am very interested in learning more about the actual fighting tactics.

I enjoyed your air-to-air articles and I hope more emphasis will be placed on this crucial new aspect of helicopter use. I am very happy to see the Army starting to realize the importance of air-to-air combat and the utilization and development of helicopters for this important role in battle.

SGT Michael L. Casmey
47th Aviation Battalion
Minnesota Army National Guard

Articles from the Aviation Digest requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, U. S. Army Aviation Digest, P.O. Drawer P, Ft. Rucker, AL 36362

Editor:

Enclosed please find a "creed" that I wrote about 1 year ago to hopefully inspire the 68G10 students that I instruct.

Being an instructor at Ft. Eustis for the past couple of years, I now feel that there is a need to let individuals know how important each of their particular aviation related skills are and the need for them to maintain the highest possible degree of professionalism when applying those skills.

The branch of the Transportation School that I am assigned to recently had 3,000 copies of this creed printed to enable each student to have a copy upon graduation, along with the diploma.

If you feel that this creed meets the standards of your magazine, I would be honored to have you share it with your entire readership through publicaiton.

Thank you for your time and consideration.

SSG Robert P. Bertrand
2d STF & FAC Co.
U.S. Army Transportation School
Ft. Eustis, VA 23604

I Am A Professional

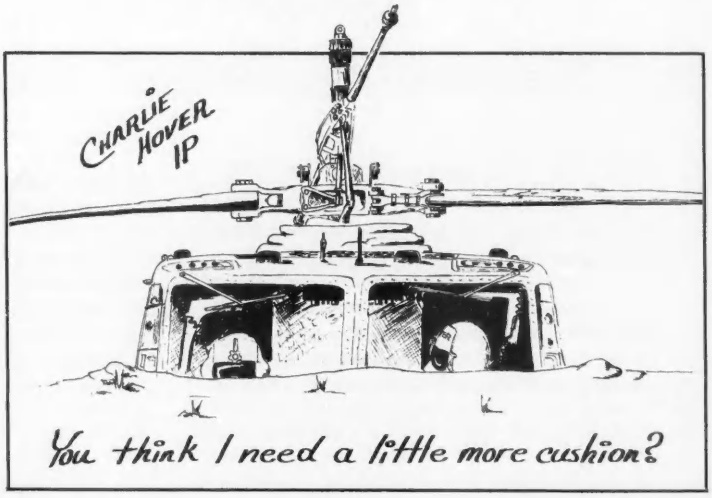
I know I am a Professional because I've been taught by those who will accept nothing less.

I have been given the fundamentals, and by using those fundamentals correctly, I will become more proficient as time goes on; but even now, I am a professional

When working on aircraft, I will always know when I'm right because I have the integrity and the honesty to admit that I don't know and to seek out the correct manuals for the answers—even after a nonprofessional tells me "how they used to do it."

Yea, I'm a professional, and as long as I work on aircraft, I will remain one; because I know that I am partly responsible to every crewmember who will ever fly on that aircraft.

As a professional, I have pride in my work, and a satisfaction in knowing that my skill is an important and integral part of aviation, because I AM A PROFESSIONAL.



1982 ATC AWARDS

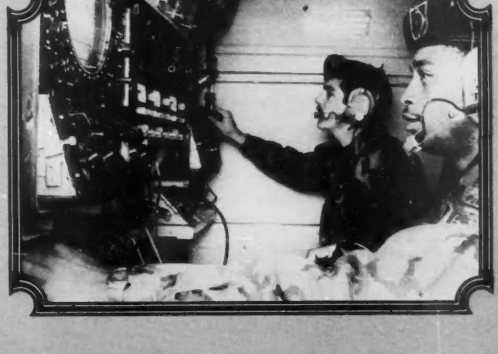
presented by the U.S. Army Communications Command, Fort Huachuca, Arizona.

Maintenance Specialist of the Year ▽ is SP6 Ronald I. Kondo of the 244th ATC Company (Forward), Camp Morse, Korea. His recommendation for the award stated that the ground controlled approach radar at his site had been out of service for a long time, and he effected the necessary repair soon after his arrival in April 1981. He was also recognized for establishing a fully integrated program to test the entire system on the site rather than just individual components

Controller of the Year ▽ is SP4 Anthony W. Cooper. He was selected for his duty with the 244th ATC Company (Forward), Camp Morse, Korea. The controller was assigned there after his graduation from ATC school at Ft. Rucker, AL, in April 1981 and served with the 244th until June 1982 when he moved to the 16th ATC Battalion, Ft. Hood, TX. SP4 Cooper was cited for his willingness and ability to take on additional duties and successfully complete the extra work

Best Tactical Platoon ▷ a new award, was won by the 1st Platoon (Airborne), 245th Air Traffic Control Company (Forward), 58th ATC Battalion (Corps), Ft. Bragg, NC. SSGT Steven K. Faucette, foreground, and SP5 David Robinson are members of the unit. One basis for the award was the work of the platoon's ground controlled approach section during Bold Eagle 82 at Eglin Air Force Base, FL, when more than 30 GCAs were done with heavily loaded Air Force C-130 aircraft into an unlighted tactical airfield at night with minimum flying weather

Facility of the Year △ is the 7th Signal Command's Army Radar Approach Control Facility, Ft. Sill, OK. Its chief is James Damron and it has 32 controllers and 10 maintainers. The facility was extensively involved with civil aviation during the Federal Aviation Administration's controller strike, while at the same time it was meeting increased military aviation radar requirements



REPORTING FINAL

Late News From Army Aviation Activities

FROM FORT EUSTIS

Contributions Recognized. Three employees of the Army Aviation Research and Development Command's Applied Technology Laboratory were recently honored for their outstanding work in 1982.

Paul Chesser, an aerospace engineer, received the Director's Award for Technological Achievement for his evaluation of the required engine performance of a 5,000-shaft horsepower class demonstrator engine based on desired airframe operation capability.

Hilda E. Fowler's work as a contract specialist earned her the Director's Award for Exceptional Service in the area of precontract and contract administration.

Thomas G. Mangrum Sr. received the Director's Award for General Excellence for his dedicated efforts and leadership abilities as chief of the Calibration Laboratory.

photo by SP4 Ronald Bowman

***Director's Awards* in various areas for outstanding contributions in 1982 were presented at a recent Applied Technology Laboratory (ATL) banquet at Ft. Eustis, VA. Participants were, left to right, Major General Story C. Stevens, commander, AVRADCOM; Hilda E. Fowler, Exceptional Service award; Dr. Jay R. Sculley, assistant secretary of the Army for research, development and acquisition, guest speaker; Thomas G. Mangrum Sr., General Excellence award; Paul Chesser, Technological Achievement award; and Colonel Emmett F. Knight, director of ATL**

Contracts Awarded. Contracts recently awarded by the Applied Technology Laboratory include:

- Boeing Vertol Co. will fabricate redesigned gearing for the heavy lift helicopter (HLH), assemble and test the combiner transmission and evaluate this transmission in terms of its contribution to the lift capability of the HLH—28 months, $2,840,000.
- A manual showing how to inspect and repair combat damage to Black Hawk helicopter airframes is being developed by Sikorsky Aircraft, United Technologies—25 months, $490,700.
- Sikorsky Aircraft will conduct a test program to demonstrate the capability of a tandem 2-hook external cargo system on the Black Hawk helicopter in place of the current single-hook system—5 months, $106,700.
- Bell Helicopter Textron will develop a helicopter external load acquisition system that can visually acquire a load during foul weather and night conditions; the contract contains an option for making and testing a prototype system—17 months, $370,188.

(Jerry Irvine, ATL PAO)

FROM FORT RUCKER

Safe Aviators. Certificates of Achievement have been presented to 188 Army aviators for their accident-free flying records:

CW2 Garland R. Crabtree of Lowe Division has flown 2,000 hours without an accident.

Certificates for 1,500 hours went to CPT Phillip L. Wade and CW3 Stephen V. Rauch, Hanchey Division; 1LT Mason M. Colbert, CW3s Brian R. Swenson, Glen W. Drew Jr., John A. Jordan, Thomas E. Martin and William D. Booth, and CW2s Roger Boyd, Gerald LaCross, Robert V. Weichmann, Walter N. Brooks and Hal W. Raber, Lowe Division; and CW2 Francis A. Rawden, 1st Aviation Brigade.

Sixty-seven aviators received 1,000-hour safety certificates, and 106 were cited for 500 hours.

Annual Writing Award. The *Army Aviation Digest* Writer of the Year Award for the period July 1981

to June 1982 has been won by Colonel James W. Lloyd of Ft. Rucker.

His article "Who's Going to Teach Aviators How to Fight?" was winner of the monthly award in February 1982. In it, he wrote that the initial entry flight training program gives students more-than-adequate instructions on how to fly but not on how to fight. With Army Aviation an accession specialty and a combat arm, the need for its personnel to be trained to appreciate the complexity of combined arms operations is urgent, he said.

Colonel Lloyd received an *Aviation Digest* Certificate of Achievement and a hand calculator. The latter was given by the Bogardus S. Cairns Chapter, Association of the U. S. Army. That organization also awards an engraved pen to each month's winner.

Certificates of Achievement were forwarded to the contest's second and third place winners: CW4 Richard A. Davis, Ft. Hood, TX, "Helicopters—the Soviet View," January 1982; and BG William W. Ford (Ret.), "Grasshoppers," June 1982.

(USAAVNC PAO)

Mike's Course Ends. The gunnery instructor pilot course which provided specialized training using the Vietnam-era UH-1M (Mike) Huey gunship has been phased out.

It originated in the 1960s as a 16-day course and was designed to provide active, National Guard and foreign instructor pilots with the techniques of fire and methods of instruction taught in initial gunnery training.

The Army deactiviated the course for the active component in 1970 and 1 year later ceased to use the UH-1M in the field. The course continued, however, for the NG and foreign IPs.

"Mike" was armed with the M-5 grenade launching subsystem mounted on the nose and the M-21, a seven-count folding fin aerial rocket pod and minigun, on each side. Its combat mission was to provide suppressive fire for friendly troop advancements, according to CW3 Charles S. Decker, course IP.

With the retirement of the two UH-1M Huey gunships at Ft. Rucker, the few still in the Army inventory now all belong to National Guard units that will continue to use the aircraft.

(USAAVNC PAO)

FROM MARYLAND

Unique Simulator Use. Most helicopter simulators are used for pilot training, but there is one

photo by SP5 NoelKenya Atkins

Colonel James W. Lloyd **center, shows Major General Carl H. McNair Jr. the calculator he received from the Bogardus S. Cairns Chapter, Association of the U. S. Army, Ft. Rucker, AL, for being selected as the Army Aviation Digest Writer of the Year. The presentation was made by Nick Saad, right, chapter president. General McNair, Ft. Rucker's commander, also gave Colonel Lloyd an Aviation Digest Certificate of Achievement**

at Aberdeen Proving Ground that is used to conduct experiments on controls and displays. It belongs to the Human Engineering Laboratory (HEL), the Army's lead laboratory for studies of how man interacts with machine.

Bill De Bellis, a laboratory engineer, explained: "In order to fly, a pilot needs to know certain information that is given to him in different forms on the instrument panel. We see how he reacts to the information and to the way it is supplied."

One project soon to be undertaken with the simulator involves experiments with a second generation single controller that will allow the pilot to operate the helicopter with one hand and possibly without the use of the feet, according to Mr. De Bellis. HEL will be looking at pilot reactions to such things as angle placement and switch and button manipulation of the controller.

Other future projects for the simulator include experimentation of pilot interactive video displays and eventually some voice interaction controls.

(APGPAO)

More than 10,000 **The former commander of Flight 3, Contact/Night Qualification Branch, Lowe Division, Ft. Rucker, AL, CPT Houston A. Yarbrough, left and the present commander, CPT Michael R. Bozeman, read the Army Aviation Center Certificate of Achievement presented the flight recently in recognition of its flying 10,777 accident-free hours in the past 12 months. CPT Yarbrough, who commanded the flight for the entire period, is now commander of 60th Company, 6th Battalion, 1st Aviation Brigade**

to by SP5 NoelKenya Atkins

AVIATION PERSONNEL NOTES

Project Manager Development Program

THE OBJECTIVE of the Project Manager Development Program (PMDP) is to identify and develop qualified commissioned officers to support future requirements for project managers and other senior officers within materiel acquisition activities in the Department of Defense.

Since December 1973, the field of materiel acquisition, and specifically project management, has been under intense review within the Army. At that time, the Secretary of the Army established the Army Materiel Acquisition Review Committee (AMARC) to conduct a comprehensive review of the Army's entire materiel acquisition process. In February 1974, the Deputy Chief of Staff for Personnel directed the commander, Military Personnel Center (MILPERCEN) to establish a Project Manager Development Office within the Officer Personnel Management Directorate (OPMD). Initial development of the PMDP began in March 1974. Continued development was directed in the approved AMARC implementing plan in May 1974. The PMDP has evolved as a formalized professional development program within the Officer Personnel Management System (OPMS).

Policies and procedures for PMDP are prescribed in Chapter 54, Department of the Army (DA) Pamphlet 600-3, "Officer Professional Development and Utilization." Unlike an OPMS specialty, which is a distinct grouping of similar positions in which officers receive professional development, the PMDP encompasses a variety of positions in a number of specialties. Positions for the development of officers in the PMDP are found in project manager offices, Headquarters, U.S. Army Materiel Development and Readiness Command and its subordinate commands; DA staff; and other activities involved in materiel acquisition management. The PMDP is applicable to all commissioned officers serving in the grade of captain through colonel on active duty managed under OPMD.

Eligibility criteria for participation in the PMDP are:

- Be in the grade of captain through colonel.
- Have completed the advanced course level of military schooling.
- Have completed 6 years of active federal commissioned service (AFCS).
- Officers possessing more than 10 years AFCS at the time of application must either possess a specialty related to one of the principal project management functions (i.e., research and development, operations research/systems analysis, procurement, logistics, etc.) or have experience related to project management.
- Have the following educational background:

Military schooling. Military schooling appropriate to grade and length of service; this includes Command and General Staff College or equivalent for field grade officers and advanced course attendance for company grade officers.

Civil schooling. Baccalaureate or higher degree. The degree preferably should be in one of the following fields:

—Management
—Engineering
—Physical Sciences.

Possession of any other baccalaureate degree is sufficient if the officer has received project manager related civilian or military training or has had qualifying materiel acquisition experience.

- Have, by manner of performance, demonstrated a high level of intelligence, initiative, imagination, judgment and potential for development as a project manager.
- Indicate a desire to participate in the program.
- Have at least 6 years of active service remaining upon entry into the program.

Assignments of PMDP members may include normal specialty development positions, duties in all phases of project management, and high level staff positions relating to project management, development and acquisition.

Educational and training opportunities for officers in the PMDP include both military and civilian

schooling. Interspecialty training includes:

- The Program Management Course (19 weeks) at the Defense Systems Management College (DSMC). Ft. Belvoir, VA.
- Training with industry (1 year).
- Short courses offered by DSMC, Army Logistics Management Center and other military schools in research and development, management, procurement, logistics and project management.

For further information, contact MILPERCEN, DAPC-OPA-C; telephone: AUTOVON 221-0250/51 or Commercial 202-325-0250/51.

Five-Year Promotion Plan

CURRENTLY IN effect is the 5-year promotion plan for the years 1982 through 1986. The purpose of this long-range promotion plan is to facilitate general force structure and management planning. The plan is applicable to field grade officers (major through colonel). The 5-year plan helps monitor the Officer Personnel Management System and incorporates the promotion objectives of the DOPMA legislation effective 15 September 1981.

The 5-year plan projects future promotions of officers by their year groups. Year group refers to those "due-course" officers who have never received a primary zone passover or selection for early promotion.

Eligibility years are shown below for both the primary and below the zones during this 5-year period. Year group designations may be used for planning, but are not official until updated and approved annually by the Chief of Staff, Army.

Due to the size of year groups 1973 through 1976, two selection boards may be required in fiscal year 1985 to maintain the required officer population in the grade of major. Another alternative might be a single 2-year group board.

FIVE YEAR PROMOTION PLAN

BOARD YEAR	YEAR GROUP BEING CONSIDERED TO			
	ZONE	MAJ	LTC	COL
82	PZ	72	67	61
	BZ	73	68	62,63
83	PZ	73	68	62
	BZ	74	69	63,64
84	PZ	74	69	63
	BZ	75	70	64,65
85 (A)*	PZ	75	70	64
	BZ	76	71	65,66
85 (B)*	PZ	76		
	BZ	77		
86	PZ	77	71	65
	BZ	78	72	66,67

* See last paragraph of article

CONNECTION

ACTAAT

Aviation Center Training Analysis and Assistance Team

NATIONAL GUARD ATC QUOTAS

ISSUE: Training personnel are dissatisfied with the fiscal year (FY) 1983 school quotas for the air traffic control (ATC) tower operator (93H) and radar controller (93J) courses. They were informed that only two slots would be available for the 93J course and none available for the 93H course for the entire National Guard during FY 1983. These quotas were unacceptable to meet mission requirements.

COMMENT: Quotas for ATC courses should not be a problem within the National Guard. Coordination with the National Guard Bureau (NGB) indicates the quotas stated in the issue are incorrect. The NGB is responsible for coordinating all quotas for nonprior service personnel into military occupational specialty (MOS) 93H and 93J. Quotas are established by an automated system using authorized, current fill, projected vacancies and projected accessions. States do not have to request allocations. FY 1983 quotas show 42 slots (nonprior service) for MOS 93J and 15 slots for 93H. All inservice allocations for the National Guard are handled by Edgewood Arsenal. Units should request slots based on anticipated requirements.

OH-58 POWER DROOP

Lieutenant Colonel Donald E. S. Merritt
Readiness Project Officer
Scout/Observation Helicopters
Directorate for Systems Management
USATSARCOM
St. Louis, MO

Mr. Charles C. Cioffi
Chief, Rotary Wing Branch
Aircraft Systems Engineering Division
Directorate for Systems Engineering and Development
USAAVRADCOM
St. Louis, MO

Illustration by Dave Deitrick

OH-58 KIOWA AIRCRAFT have been experiencing a phenomenon since 1975 which manifests itself in the form of a power turbine droop. The incidents are generally losses of power turbine (N_2) revolutions per minute (rpm). In many of these cases, the incidents cannot be duplicated by maintenance personnel while troubleshooting after the in-flight occurrence.

During January 1975 through March 1981, there were 159 occurrences of power droop. In an effort to correct this phenomenon, 10 safety-of-flight/maintenance advisory messages were issued to the field. In light of the continuing phenomenon, it was evident that none of these fixes had corrected the problem.

In view of this, the commander of U.S. Army Troop Support and Aviation Materiel Readiness Command (TSARCOM) requested the commander of U.S. Army Aviation Research and Development Command (AVRADCOM) to assemble a team with appropriate technical expertise to review this problem and to arrive at a solution. A group was formed in September 1981, called the OH-58 Power Droop Panel, composed primarily of members of AVRADCOM; TSARCOM; members of various laboratories; United States Army Depot, Corpus Christi (CCAD); Ft. Rucker, AL, representatives from the Aviation Center and the U.S. Army Safety Center; and contractor representatives from Bell Helicopter (airframe), Detroit Diesel Allison (engine) and Bendix (fuel control and governor).

A final report was published in February 1982 which summarized the investigation and gave conclusions and recommendations. A few of the major conclusions were:

- There was no single cause found.
- The hardware and technical documentation had not been kept current with corresponding changes from the commercial fleet.
- The aircraft had marginal tail rotor control and the OH-58A had marginal engine power.
- The maintenance procedures and training needed improvement.

The Power Droop Panel adopted the following definitions in order to accurately address the topic of power droop:

Droop: The loss of N_2 to a point where safe operation of the helicopter as defined in the operator's manual cannot be maintained.

Power Loss: The loss of N_1 rpm to a point as to trigger low rotor

warning horn so that further flight is not possible.

Flame Out: The complete loss of power with no indication of TOT (turbine outlet temperature).

It was interesting to note that the reported mishaps covered a rather broad range of suspected causes, with no particular item standing out as a singular cause; the suspected causes are shown in figure 1.

During the review of these 159 cases, an attempt was made to identify the portion of the flight regime in which the loss of rpm occurred. The results are shown in figure 2.

Engine and component investigations were performed at CCAD on equipment from four different geographical locations where power droops had occurred during the existence of the Power Droop Panel. There was no one item identified in these investigations which would have conclusively caused the reported power droop.

During testing of an OH-58C, in an attempt to determine the cause of its power droop, it was found that rapid collective inputs could cause transient droop to as low as 97 percent N_2. Recovery would occur in 3 to 5 seconds, which is a normal rate of response for this control system.

It was concluded that the existing limits, in Army manuals, on transient droop would cause the OH-58 to be landed and unscheduled maintenance to be performed. The allowable limits in the Army manuals on power droop were considered confusing and also a potential cause of an unwarranted power droop write-up. A message was sent to the users defining a normal N_2 power droop (Maintenance Mandatory Message OH-58-81-08).

In addition, the OH-58A Maintenance Test Flight (MTF) manual was revised and a new MTF manual was prepared for the OH-58C. Included in these manuals were procedures to accomplish an engine performance check to determine that the aircraft system performs in accordance with the performance charts in the operator's manuals.

The OH-58 is powered by the T63 series engine which is classified as a gas-turbine engine. In a gas-turbine engine, the gas combustion process is continuous, and this energy is absorbed by four turbine stages. The turbines extract the gas energy and convert it into mechanical energy as shaft horsepower.

Inlet air is brought in through the intake section of the engine to the compressor section. The compressor produces the required air pressure rise and accelerates the air to the combustion section. On this engine the N_1 rpm (gas producer) varies directly with output power; if output power increases, N_1 rpm increases and the converse. The air pumped by the compressor is routed to the combustor section where the air is burned with the fuel to develop the engine power (figure 3).

The hot gases are then directed to the turbine section where they drive the gas producer (N_1) turbine and power turbine (N_2). The N_1 turbine rotor is used to develop the horsepower required by the compressor rotor. The N_2 turbine shaft is coupled to the power turbine gear train which provides the driving force for the helicopter.

FIGURE 1

OH-58 Mishaps from January 1975 to March 1981 where there was a loss of rpm (by cause)

SUSPECTED CAUSE	75	76	77	78	79	80	TOTALS	%
Double Check Valve: Sticking/Clogged/Failed/Other	7	8	2	1	—	5	23	14%
Loose Air Lines	2	3	1	5	1	5	17	11%
Governor: Failed/Suspected/Other	9	2	1	1	3	18	34	21%
Fuel Control: Adjustment/Failed/Other	1	3	2	1	2	5	14	9%
Linear Actuator: Failed/Defective/Other	3	1	—	—	—	2	6	4%
Contaminated Fuel	3	2	—	—	—	1	6	4%
Could Not Find Problem, or Could Not Duplicate Problem	9	7	4	5	2	13	40	25%
Other	6	2	2	1	1	7	19	12%
	40	28	12	14	9	56	159	

(SOURCE: USASC PRAM Printout, dated 31 March 1981)

FIGURE 2

OH-58 Mishaps from January 1975 to March 1981 where there was a loss of rpm (By Flight Regime)

FLIGHT REGIME	NO. OF OCCURRENCES
Cruise	42
Climb	11
Hovering	10
Take-off and/or hovering to take-off	25
Approach to landing	13
Initial flight regime not stated	30

(SOURCE: USASC PRAM Printout, dated 31 March 1981)

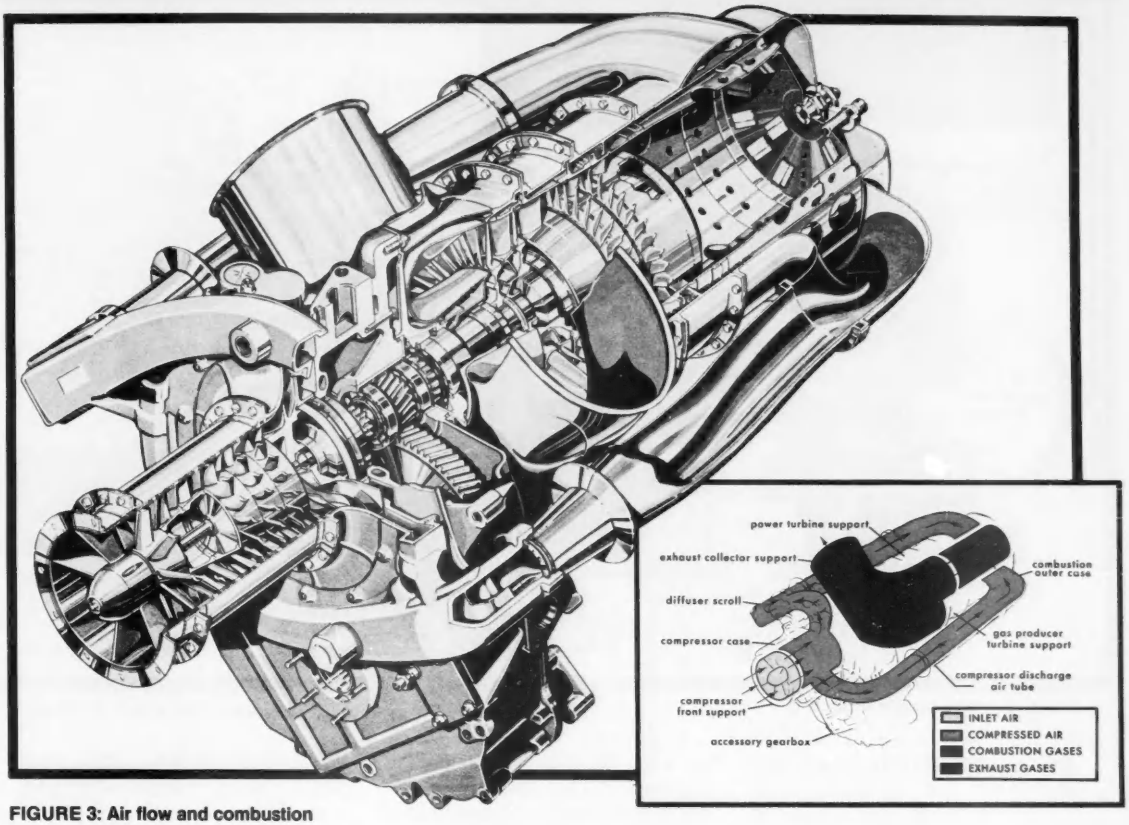


FIGURE 3: Air flow and combustion

The T63 engine power output is maintained by controlling the gas producer (N_1) speed. (The gas producer drives the compressor which pumps air to the combustor.) N_1 speed levels are maintained by a power turbine (N_2) fuel governor which senses N_2 speed. The operator selects N_2 speed and the power required to maintain this speed is automatically maintained by the N_2 governor action on metered fuel flow to the combustor. The N_2 governor requirements are scheduled by the N_2 governor lever; the N_2 governor schedules N_2 speed to changing power outputs to maintain the required output shaft speed.

The basic parts of the fuel system which are necessary to control engine power output are:

- Throttle—collective stick twist grip.
- Droop compensator.
- Governor rpm switch: pilot's N_2 "beep" switch.
- Gas producer fuel control.
- Power turbine governor.
- Fuel pump and fuel filter.
- Fuel nozzle.

Fuel for the engine is supplied by an engine-driven fuel pump from the OH-58 fuel system. The fuel pump is gear driven and delivers fuel to the gas producer fuel control; excess fuel is bypassed back to the pump. The fuel control delivers metered fuel to the fuel nozzle, where it is sprayed into the combustion lines, mixed with air and burned (figure 4).

The power-turbine governor is used for speed governing of the power-turbine rotor; the N_1 fuel control and the N_2 governor are connected together by two pneumatic lines.

A schematic of the T63 fuel control system is shown in figure 5. This system is a pneumatic system and was selected due to its original simplicity; however, as time evolved, its complexity grew in order to overcome operating problems.

The fuel metering system in this pneumatic system, as described in

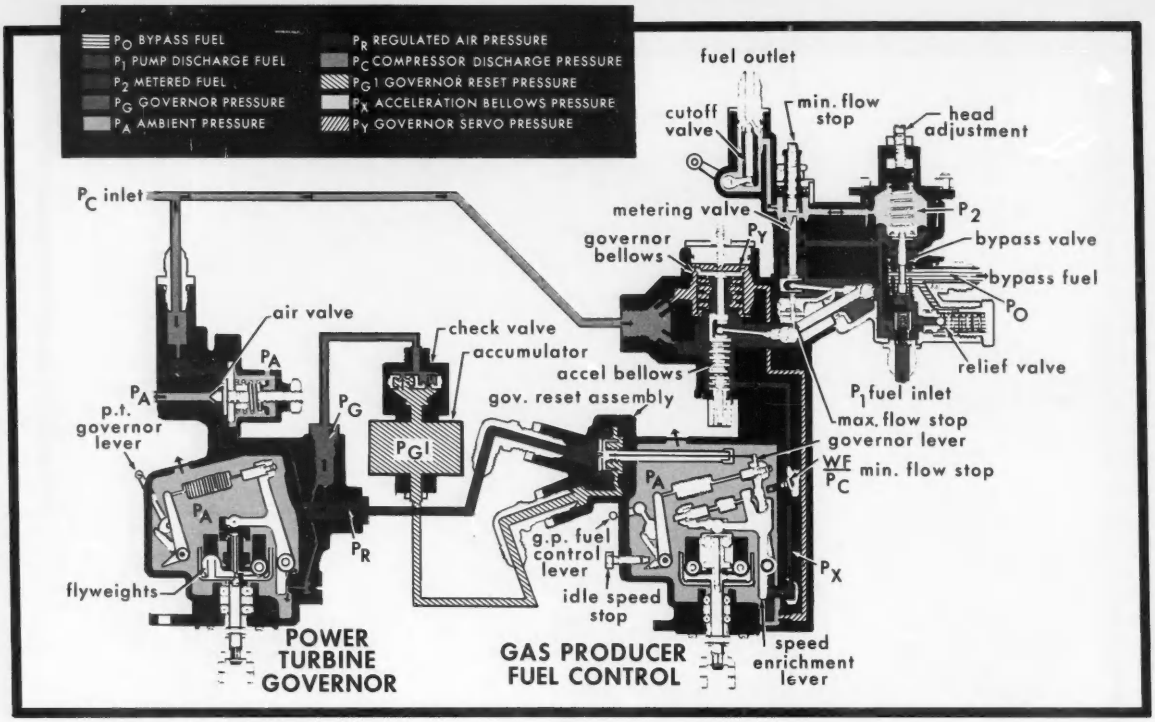


FIGURE 4: Fuel control schematic

grossly simplified manner, operates as follows:

The engine-driven fuel pump supplies fuel to a fuel metering valve which controls the rate of fuel to the fuel nozzle inside the combustor.

Compressor discharge pressure (P_C) is routed through an orifice to a bellows and flyweight control in both the N_1 fuel control and the N_2 governor.

The bellows located in the N_1 fuel control moves to control the fuel metering valve to control the fuel flow to the fuel nozzle in the combustor.

The flyweights of the N_1 fuel control and the N_2 governor are gear driven. As the set speed is changed either the N_1 or N_2 flyweight will move and change the P_C pressure to the bellows; this will change the setting of the fuel metering valve and vary flow to the fuel nozzle.

Obviously, the system operation is somewhat more complicated; however, the intent is to show that since fuel flow and thus horsepower output is controlled ultimately by a pneumatic system, it is extremely important that the integrity of the air lines system be maintained and that no leaks be permitted.

The OH-58 Power Droop Panel did encounter many instances where power droops and power losses occurred and they were attributable to air leaks in the system. Referring to the fuel control system schematic, it is apparent that air leaks in the pneumatic circuitry cannot be tolerated. Visual inspection made by checking the torque of interconnecting nuts in the lines cannot locate air leaks, as has been proven countless times. The only reliable check for air leaks is by a pneumatic circuitry system pressure check as described in the technical manuals.

In summary of the 26 major conclusions of the OH-58 Power Droop Panel, the most singular item which was perplexing is that no single cause of power droop could be identified.

In response to certain Power Droop Panel recommendations, a controlled verification program will be undertaken at Ft. Rucker, AL, using a group of helicopters with certain modifications installed. The modifications are as follows:

- **Airframe Mounted Fuel Filter:** A more effective fuel filtration system to prevent fuel contamination to the engine.
- **Throttle Friction Clamp:** A nylatron clamp added to the base of the collective stick to prevent inadvertent throttle roll-off.
- **Throttle Friction Sleeve:** A nylatron sleeve added to the push-pull controls to more uniformly control system friction.
- **Fuel Line Clamp:** Modification to the fuel line inside the fuel tank from a clamped arrangement to a

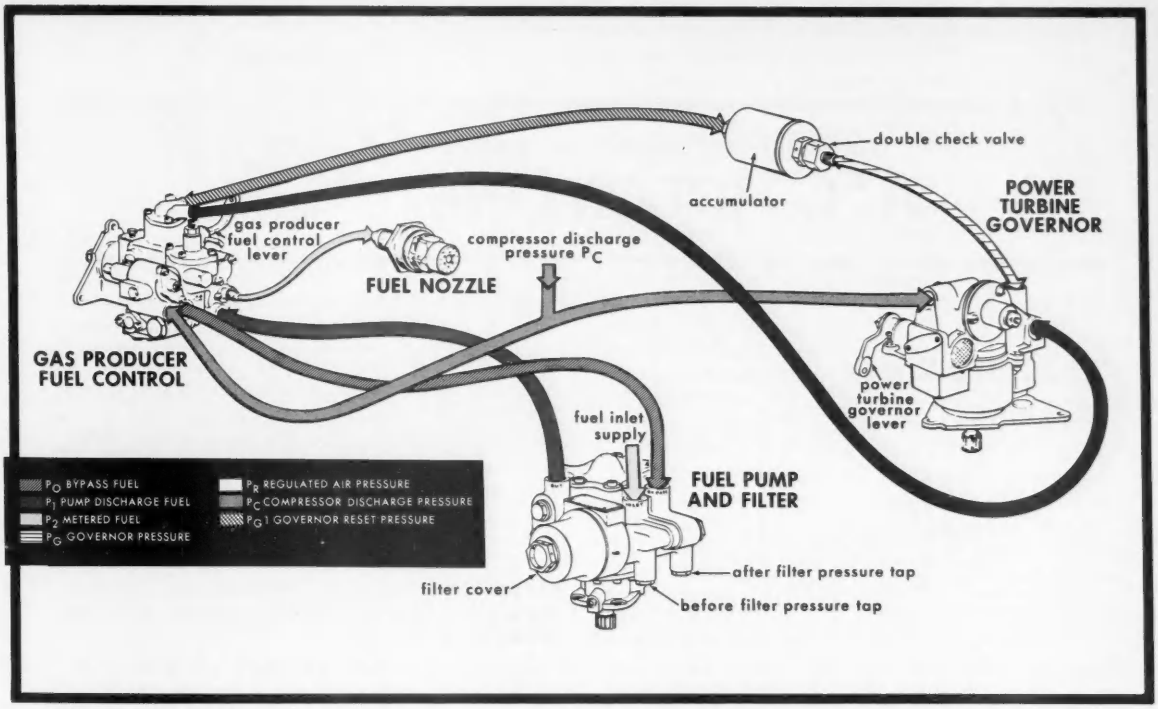


FIGURE 5: Fuel system schematic

screw-on type connection to prevent air leaks.

- **Droop Compensator Lever:** Add a new lever at the N_2 actuator with an additional hole to allow for more movement of the governor control to provide more droop compensation.
- **Auto Relite Kit:** Add a new relite box with improved timing. This is not related to the droop problem but could provide a safety device in case of a flameout.
- **Fuel Control:** Update to the latest commercial configuration.
- **Power Turbine Governor:** Update to the latest commercial configuration including the latest spring drive and a 4 percent higher setting to compensate for wear and hysteresis in service.
- **P_C Filter:** Add to the OH-58A aircraft series; continue development of a more effective filter.

It should be noted the above items are not listed in any order of priority. After the field evaluation of the installed modifications has been satisfactorily completed, action will be taken to obtain funding to retrofit these improvements in the OH-58 fleet.

Continuing actions will include the following:

- Investigate the feasibility of providing a leak test set for the pneumatic circuitry.
- Investigate the practicality of crush-type washers in the pneumatic circuitry to obtain a more effective airtight system, or some other method of obtaining an effective airtight system.
- Review the technical manuals and overhaul manuals and update and revise where required.
- Investigate possibility and practicability of providing a training team and/or training films to provide engine rigging and maintenance data.
- Conduct an engineering investigation and analysis of the spin phenomenon in the OH-58 (in-process), update the flight manuals where required.
- Implement a program to recommend replacement of the T63-A-700 engine in the OH-58A with the T63-A-720 series engine.
- Continue to monitor all field reported failures of power droops and power losses, and perform an analytical investigation on selected items in an attempt to further define this phenomenon.

The major conclusion of the OH-58 Power Droop Panel was that with incorporation of all the above mentioned improvements the possibility of future recurrence of the power droop incidents would be reduced to a minimum. TSARCOM and AVRADCOM are engaged in long-term solutions to assure the Army is provided with the most safe and operationally capable aircraft that technology can provide.

"But I DID Check NOTAMs!"

Major Philip W. Richard
Chief, Priority Air Transport Division
Ft. George G. Meade, MD

". . . don't understand where all those 'chutes came from. Guess that danglin' guy I hit was killed too. I wonder if any of my crew lived? Wonder who'll tell Bonnie that I won't be home for supper . . . not ever? Saint Peter, . . . Sir, I did check NOTAMs! Honest!"

How thorough is your NOTAM check? Did you know that nearly every day there are Army parachute operations conducted by military aircraft on Army installations (frequently on seldom-used Army airfields), and that this information is never published in the military NOTAM system? It's NOTAM information, sure, but it's only published in the FAA local NOTAM file. Why? Parachute operations, both military and civil, don't fit the criteria for inclusion in either the Air Force NOTAM system or the FAA NOTAM D System. So where does that leave you and your flight planning? Could be on the odoriferous end of the proverbial stick if you're not real careful. Of course, the first paragraph is fictitious . . . but it nearly wasn't! Read on.

Let's say you're planning an IFR flight from Anywhere, USA, to Blackstone, VA. If you only use L-22 or L-27 en route charts to plan your arrival then you won't notice the little parachute symbol next to the aerodrome on the Washington Sectional. But you avoid "strike one" by reading the small print in the IFR-S. Aha! Extensive parachute operations. And look here—tower only operates in the summer months. No sweat. You check NOTAMs at base ops, like you always do, and find that the tower is closed but there's nothing about a paradrop. Ho, ho and away you go. Next stop, Blackstone. Strike one!

Tower is closed, but there's a base ops frequency. Unfortunately, either you don't have FM, or it doesn't work, or his doesn't work, or for whatever reason you can't talk to base ops. No problem, right? After all, this is just another uncontrolled airport—don't have to talk to ops. Strike two!

You didn't come all this way for nothing, so you glance to the northeast of the airfield to look for the DZ. Don't see anything. Good! Short final for the east-west runway. "Gear," "flaps," "'chutes," . . . 'chutes!? Strike three, you're out!

That DZ isn't northeast of the field, it's *on* the field. In fact, it's the north-south intersecting runway. And this doesn't have to be Blackstone; it could be any number of similar operations at Redstone, White Sands, Camp Roberts or anywhere in between. It could be LAPES, HALO, heavy drop, air show, equipment demo, ordnance disposal, you name it. The point is, an awful lot of hazardous happenings don't make it to the base ops NOTAM file.

To avoid strike one, call flight service and ask specifically for *local* NOTAMs for your destination. If you just ask for NOTAMs, you'll likely get only NOTAM D material. That won't help much because only certain FAA NOTAM D information is included in the Air Force NOTAM System that's on file at base ops. Also, local NOTAMs are only distributed to flight service stations within about 200 miles of the affected installation. So, if you're filing to Blackstone, VA, from Atlanta, GA, you'll have to phone Washington, Danville or Newport News FSS. If phone lines are scarce, you can do this by radio before arrival . . . but, somehow, DO IT! It could save your hide!

Readers are encouraged to address matters concerning air traffic control to:
Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22314

1983 ANNUAL WRIT

ARMY AVIATION is undergoing the most dynamic changes in training and doctrine in its 40-year history. Through training symposiums and program reviews, the aviation community is striving to resolve questions and issues having great impact on procedures and training. One question presented during the 1981 Training Symposium was, "What is the value of the Army Aviation Annual Written Examination (AAAWE)?" After much discussion, the Policy Committee made the following three recommendations to determine the Annual Writ's value:

(1) DA task TRADOC to evaluate the writ's value by conducting a trial on a select test population consisting of aviators from one or two installations and exempting them from taking the Annual Written Examination. Later, the Directorate of Evaluation and Standardization (DES), Ft. Rucker, AL, would evaluate the performance of the test group.

(2) Drop the 4-hour time limit requirement to complete the AAAWE, and allow all the time needed.

(3) DA task TRADOC to analyze the requirement for the annual writ based on information gathered by the test group.

A plan was developed to complete the necessary actions. After reviewing aviation records, it was determined the analysis of the Annual Writ could be conducted at Ft. Rucker by comparing scores of DES no-notice checkrides, scores on the Annual Writ, and annual contact rides and dates. The results of this analysis were presented at the 1982 Training Symposium. Meanwhile the 1983 Annual Writ was sent to units in November 1982 with a format essentially the same as last year's Annual Writ.

To satisfy the written component of the Annual Aviator Proficiency and Readiness Test (AAPART), successful completion of the examination is required during the 90-day period preceding the last day of your birth month. Army Regulation 95-1 specifies procedures for both taking the exam and for failures. The process of keying examinations to the aircrew training manuals (ATMs) began in 1977 and is being continually refined. Each exam consists of 50 multiple-choice questions and is oriented to the tasks and combat missions in the respective ATMs, allowing questions to be directed to your mission and aircraft. This helps avoid irrelevant and general-nature questions. The writ has evolved from a single booklet with 100 questions in 1953 to the current publication of four versions for each aircraft type. The test is now applicable to overall mission requirements.

The exam consists of the exam booklet, reference data booklets (RDBs) and the exam notice. The exam booklet contains instructions, the exam questions, performance, and weight and balance charts. In some versions, weather forecasts and notices to airmen (NOTAMs) for instrument flight questions are included. To keep the exam challenging, yet reduce RDB research time, questions are in groups which often begin with a NOTE that includes the reference manual title. In that group, questions are taken sequentially from the reference.

The AAAWE actually is 24 separate exams. There are four versions for each aircraft type for which an ATM is published. They are:

- Observation Helicopter (OH-58, OH-6)
- Utility Helicopter (UH-1, UH-60)
- Attack Helicopter (AH-1)
- Cargo Helicopter (CH-47, CH-54)
- Surveillance Airplane (OV-1)
- Utility Airplane (U-21)

A T-42 version is being developed for utility airplane pilots and will be distributed to Test Control Officers (TCOs) after complete verification. Of the four versions in each ATM category, two are based on the Federal Aviation Administration (FAA) regulations and two are written to International Civil Aviation Organization (ICAO) flight rules for aviators operating in Europe. Your unit TCO will administer either the FAA or ICAO versions, based on your unit's location.

Your TCO should issue the exam notice. It describes the exam, lists references and gives hints for studying and taking the exam. The TCO will also issue AR 95-1, AR 95-5 and En Route Low Altitude Charts. You may bring your dead-reckoning computer and an electronic calculator. An operator's manual for the appropriate aircraft is desirable, since most performance charts reproduced in the exam are without instructions or explanations for their use. Volume I of the RDB contains extracts of flight information publications (FLIPs) for FAA exam versions and is unchanged. Volume II has been reprinted for 1983 and contains indexed extracts of field manuals, training circulars, regulations and other appropriate publications.

The AAAWE is an excellent evaluation tool. TCOs should analyze local examination results and provide information, as desired, to commanders.

When an aviator has missed several questions in one subject area (e.g., instruments, threat, or weight and balance), it may indicate a need for further individual training. If several aviators show a particular weakness, further unit training may be needed. Commanders should be innovative in using results to improve individual and unit proficiency.

The U.S. Army Aviation Center welcomes your comments and constructive criticism. Please provide feedback to Commander, USAAVNC, ATTN: ATZQ-TD-TAD-TD(AAAWE), Ft. Rucker, AL 36362, or call us at AUTOVON 558-5412/5318. Good luck!

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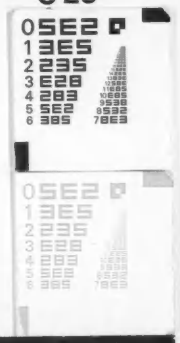
Illustration by 2LT Jay Jennings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